

Inside Admission and Air Tuning a Ruby

Original Topic URL: http://www.mylargescale.com/forum/topic.asp?TOPIC_ID=20759

Topic author: Dave Hottmann

Posted on: 26 Feb 2004 13:01:45

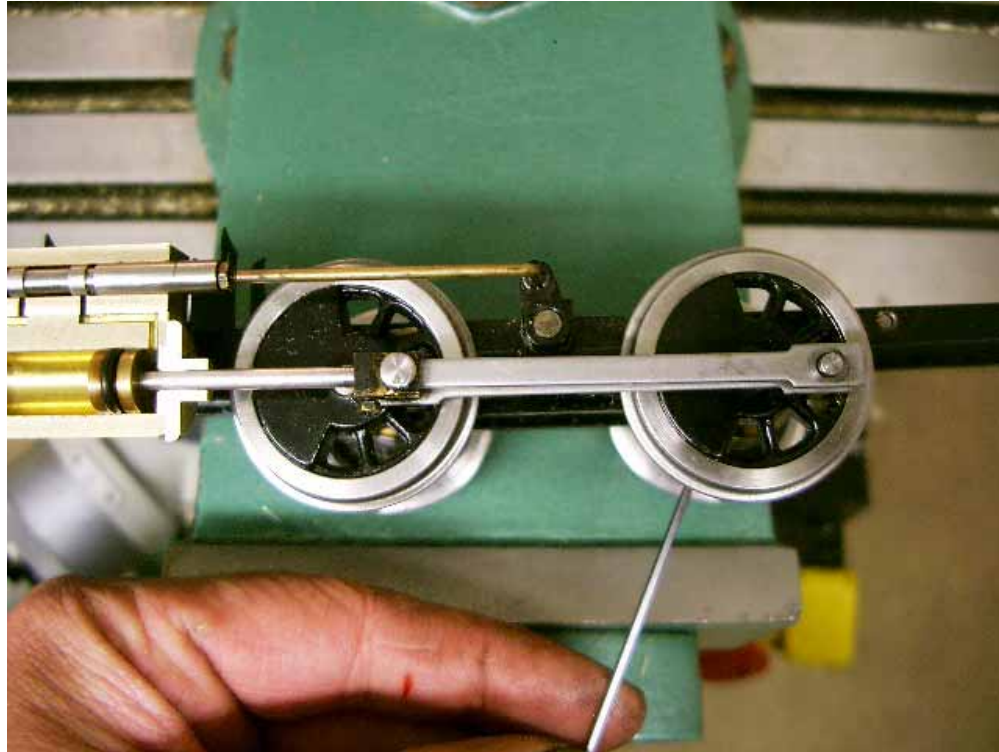
Out of the box Rubys are set up as outside admission piston valve engines in forward. Outside admission is how the steam flows through the valve and is admitted to the piston. Many of you have observed that Rubys run better backwards. A big reason for this is that Rubys are inside admission in reverse. Direction change is done by changing the steam flow not by changing the valve motion. This can be changed by rotating the eccentrics 180 degrees making the engine inside admission in forward and outside in reverse. The eccentrics control the valve motion and admission timing. The Johnson bar will become backwards. This can be corrected but is not necessary.

Here is a cut-a-way view of outside admission. Note that steam pressure tries to push the piston valve out of the valve block. This loads the valve linkage and eccentrics. This loading causes friction that leads to wear of the eccentrics and linkage. This is also friction that the engine has to overcome hurting performance. Steam pressure enters the valve bore through the hole at the end of the paper arrow from the direction valve. In the front end of the valve there is a hole in the center of the valve that connects the front of the valve with the narrow groove. The wide groove is exhaust and there is hole behind it that connects to the direction valve block.

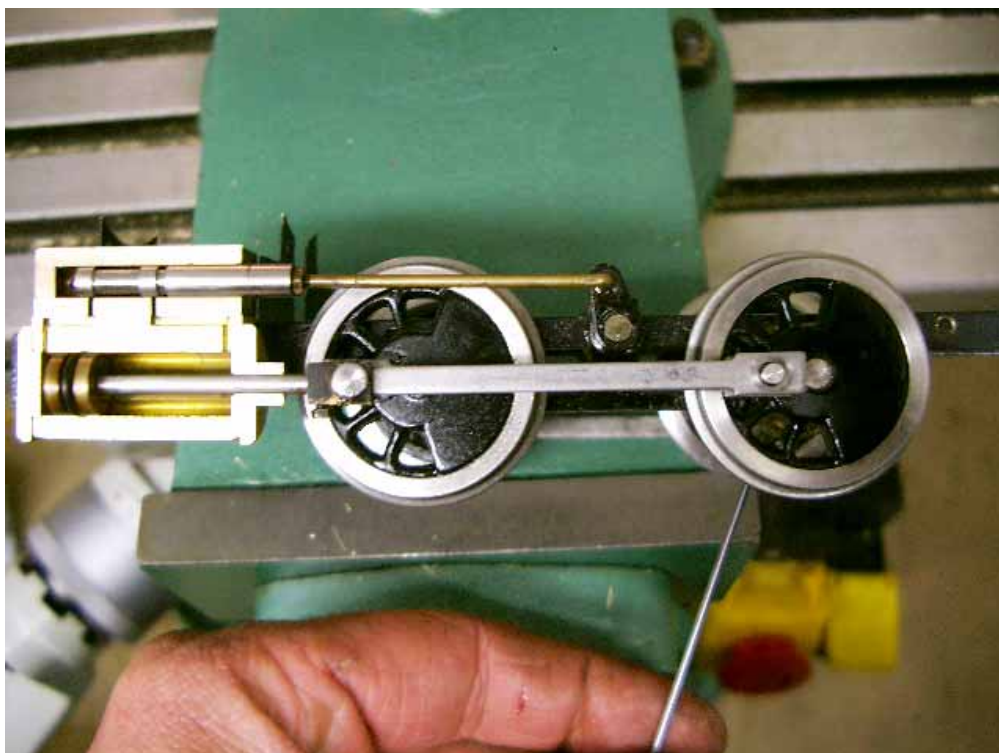


Rotating the eccentrics is done by loosening the two 1.5mm Allen head set screws that secure it's position on the axle. This can be done on a complete engine. The pictures will be of my cut-a-way. In rotating the eccentrics 180 degrees I have found it best to loosen the second set screw with the rod pin in the 3 or 9 o'clock position and note the Allen wrenches position. Hold the eccentric's position with the wrench and rotate the driver 180 degrees then tighten the set screw. I leave the other set screw loose until I have air tuned the engine. Repeat this on the other side.

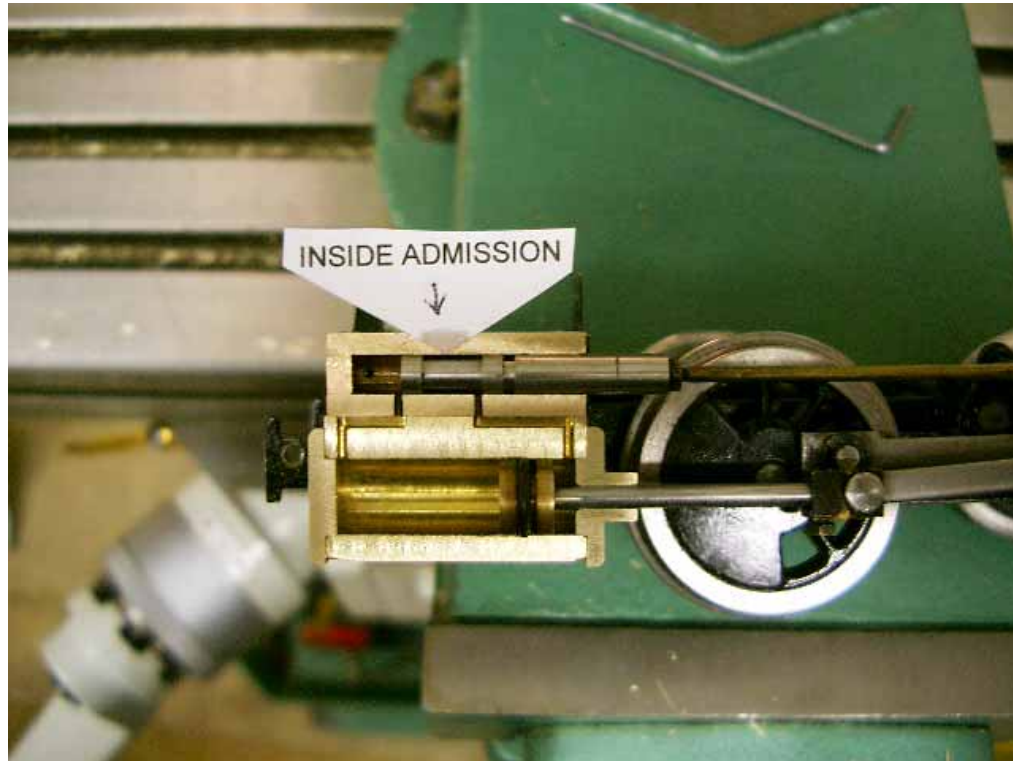
Here's loosening the second set screw and holding the eccentrics position.



Here's holding the eccentric still and the driver has been rotated 180 degrees

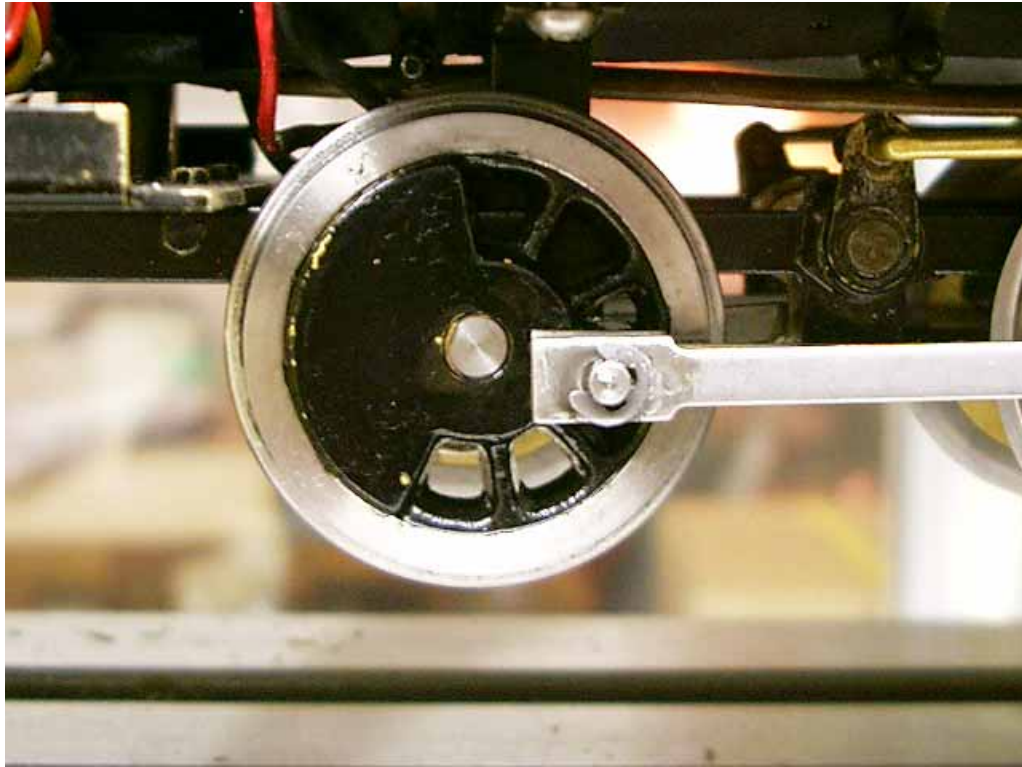


After rotating the eccentrics 180 degrees the engine is now inside admission in forward. Instead of steam pressure pushing the valve out of the block there is only whatever pressure is left in the exhaust. You can also see in this picture how the steam goes from the wide groove through the passages to the rear of the piston. The steam then pushes the piston forward and rotates the driver through the rod. This is not correctly adjusted to show the flow better. Admission actually starts when the passages start to "communicate" or open to each other. Admission keeps happening through a portion of the piston's travel and is "cutoff". Don't hurt your brain too much thinking about this. What is important is when the admission starts.

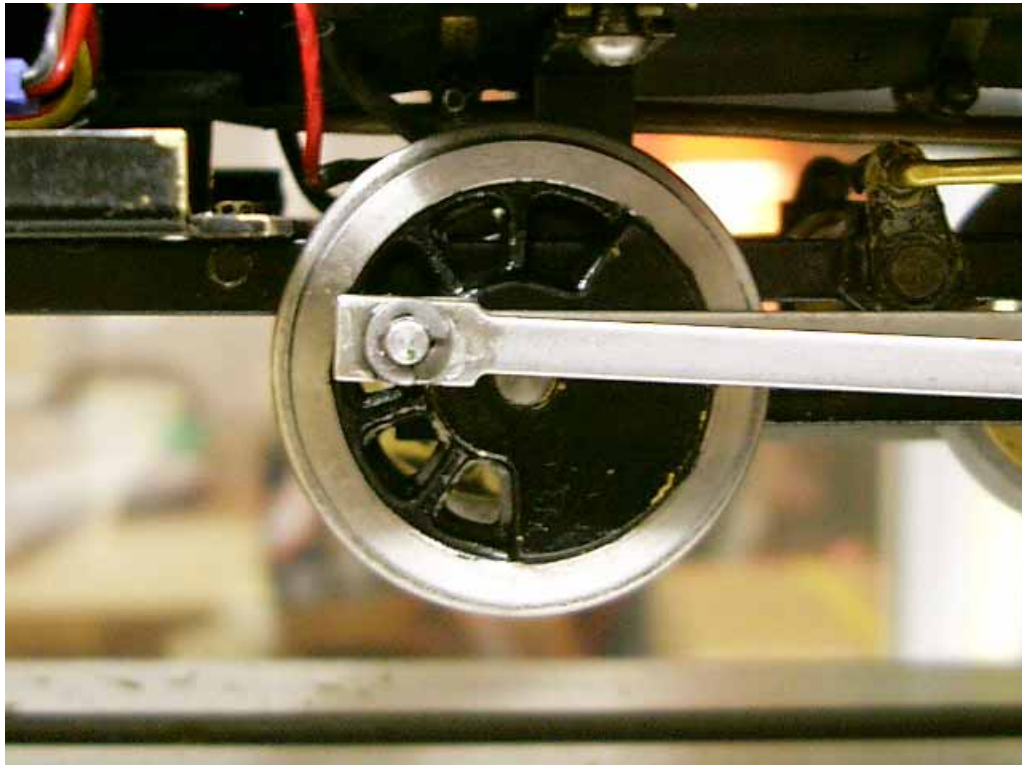


Now on to air tuning a Ruby whether it is outside or inside admission. For outside admission Rubys the line on the direction (or center) valve should meet the valve block in forward. Inside admission in reverse. I prefer to tune for the best forward possible and live with a not so smooth reverse. A perfect forward is seldom possible because of very small machining imperfections. This should be done on a completed engine. These principals also apply to air tuning other steam engines. By tuning with air at slow speeds you can see the admission events in the rotation of the drivers and gain a better understanding of what it takes to get a steam engine to run and run well. It is difficult to explain everything with words and still pictures. Air tuning should be done with the engine supported on blocks so the drivers are free, and with an empty boiler and oiler. Water or oil that gets into the cylinders can cause hydrolocking and drive you crazy. Use low air pressure of 5-20 psi and adjust the flow with the throttle valve. Make sure the moving parts are lubed and free of binds. A new engine may have binds that won't go away until it is broke in and may be difficult to tune. After break in it may need more fine tuning.

Admissions should start just after dead center of the rotating direction of the driver. Dead center is when the piston is at the end of it's travel and the rod pin on the driver is AT 3 or 9 o'clock. Admissions that start before dead center try to make the driver go the wrong direction. On the right side of the engine you want the admissions to start when the rod pin is just after 3 and 9 o'clock. Left side is just before 3 and 9 o'clock. Here's the right side after 3 o'clock. Note that the rod pin center is below the axle center.



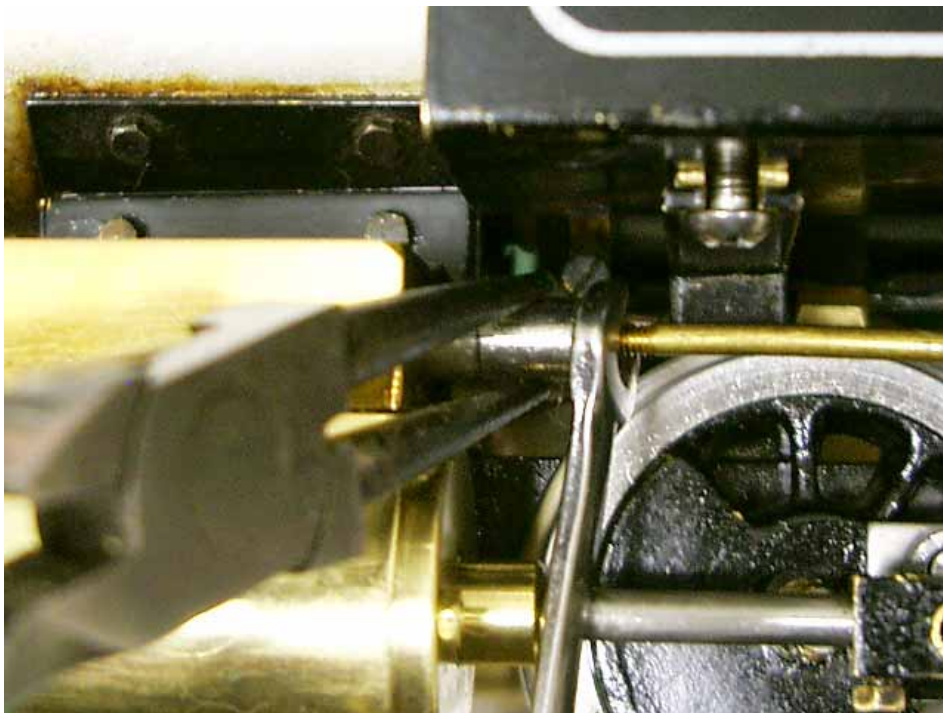
Right side after 9 o'clock. Note that the rod pin center is above the axle center.



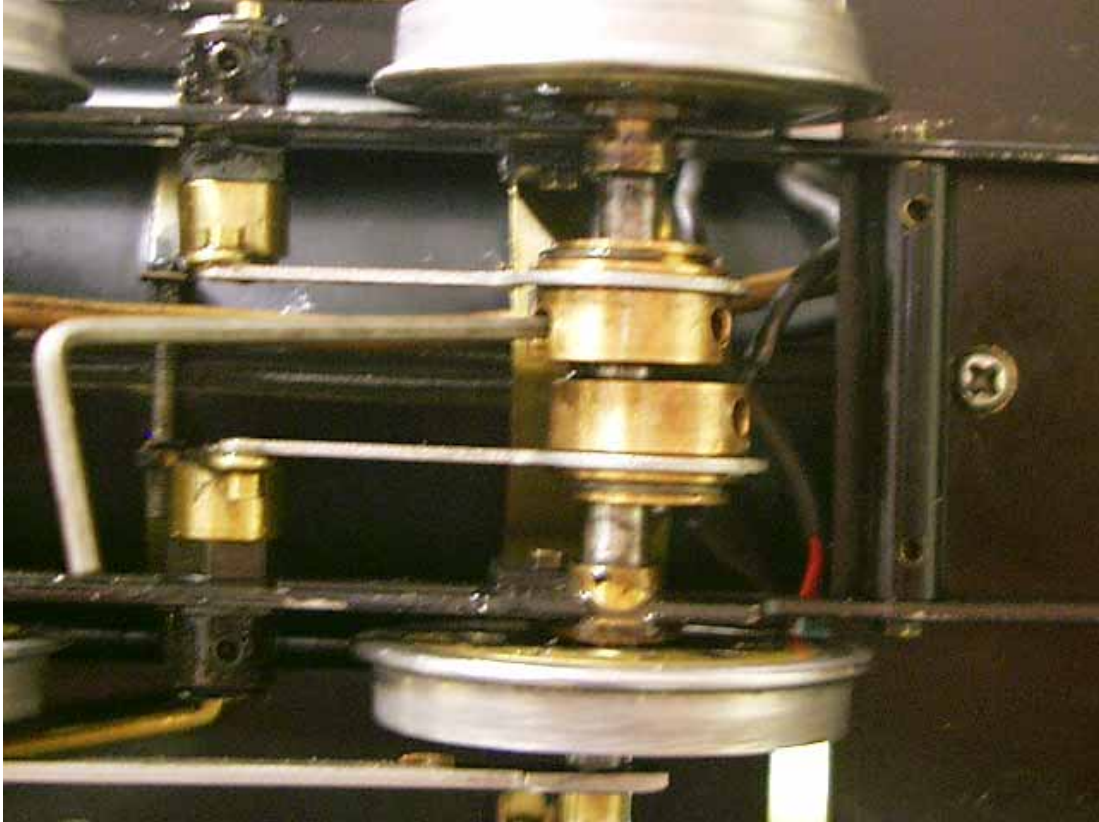
Place the engine on blocks, add air pressure in the boiler, and open the throttle until the engine is running. Let it run long enough to work out any water or oil. Then turn the throttle down until the engine stalls or hesitates. If the engine stalls start it running again with a finger and confirm the stall points. Make note of where the hesitations and stalls are. The poor admission events near 3 and 9 o'clock are on the side you are looking at. The poor admissions near 12 and 6 o'clock are on the other side. Here's my Ruby on blocks with a garden sprayer for the air supply.



Pick the worst 3 or 9 o'clock admission event as a starting point for adjustments. After the worst event is determined remove the air supply or turn the throttle off. Most likely this will be a late event. An example of a late is 4 o'clock on the right side. First thing to adjust is the valve and adjust it the right way keep the adjustments small. From the point of the worst event rotate the driver backwards 90 degrees. Then rotate forwards 90 degrees while watching the direction the valve moves. This determines which way the valve needs to be adjusted. For late admissions events the valve will need to be adjusted in this direction so the passages communicate sooner. For early admission events the valve will need to be adjusted the opposite direction. If both 3 and 9 o'clock are early then retard the eccentric first. The valve and rod have right hand threads. To adjust the valve loosen the lock nut and rotate the valve with a pair of needle nose pliers and tighten the lock nut. As you adjust the late out of 3 or 9 o'clock the other will be come late. Adjust and test until the lates are equal. When the lates are equal then the eccentrics can be advanced. Here's where to adjust the valve with a 4mm open end wrench and a pair of needle nose pliers.



To advance the eccentric, loosen the 1.5mm Allen head set screws and rotate the eccentric a small amount in the drivers' forward rotating direction. This is called advancing because things will happen sooner. Retarding the eccentric is rotating in the opposite of the drivers' forward rotating direction. Advance and retest until the engine runs smoothly and slowly. Sometimes the valve will need to be adjusted after adjusting the eccentric. When you advance one to many times and the engine hesitates AT 3 and 9 o'clock, then retard the eccentric a tiny bit and call it "good enough". Keep adjusting and fussing until the engine will run about 1 revolution per second or less. Here's where to loosen the eccentric set screws.



Basic rules to follow are:

1. Adjust the valves to make the lates equal.
2. Adjust the eccentrics to get rid of the lates.
3. Work on one side of the engine at a time.

When I first started tuning with air it took me hours. If I stick to the basic rules and am lucky it only takes 20 minutes. Remember reading the instructions is not admitting you are weak, IT'S CHEATING!

Added 3/3/04

I shot a lo res digital video titled "Well Tuned" that is 9 seconds of my Ruby running on air. I was not able to upload it but Landon Solomon (aka Trot "The Loading Wizard" Fox) did it for me. The video is 1 Meg and takes about 4 minutes to down load on a 48K dailup connection. It is not slow motion but actual speed, and the admission events are not visible. The engine WILL NOT run this slow on steam. The steam condenses in the cylinders and cause the engine to stall. Took 3 1/2 years to get it to run this smooth. This includes 3 years of mistakes.

Here's the link,

<http://1stclass.mylargescale.com/trotfox/video/welltuned.avi>

Thanks Landon!

Replies:

Reply author: rwjenkins

Replied on: 26 Feb 2004 14:29:39

Great explanation there Dave. Now could you post something similar for the C-16? 🙏 I assume it's pretty much the same process, but how are the valves adjusted?

Also, when you're running on air, how do you keep the cylinders lubricated? Or is there generally enough oil left behind from the last steam run that it's not really a concern?

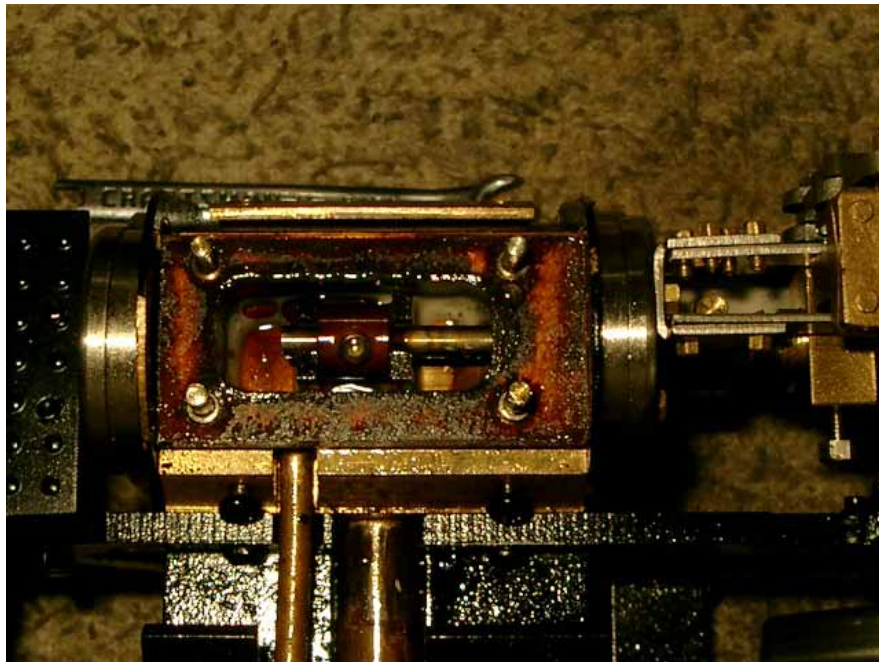
Reply author: Dave Hottmann

Replied on: 26 Feb 2004 15:21:37

Richard,

On C-16s the valve motion is changed to change direct instead of changing the steam flow. This makes it very important to make sure the Johnson bar is adjusted first to ensure full stroke of the valve. The eccentric adjustment is the same. The valve adjustment is different. C-16s have "D" or sometimes called slide valves. D valves are outside all the time. This is so the steam pressure helps hold them down and seal. To adjust these valves you need to remove the valve cover to gain access to the set screw. Loosen the set screw and move the lockring and valve on the rod a VERY VERY small amount in the needed direction. Install the cover to keep the air in and retest. To speed things up on C-16s I hold the cover on with a small clamp instead of using the nuts between adjustments.

Here is a picture of #461 K-27 valve which is the same as a C-16. Note the set screw in the lockring for the valve.



There is no need to worry about the cylinder running dry of oil when air tuning. The air doesn't steam clean the oil from the last run out like steam does.

Reply author: Tom Farin
Replied on: 03 Mar 2004 18:55:37

Hi Dave,

Great job. Will you have any problem if I lift these instructions and add them to Chapter 3 of SteamClass 2004?

Tom

Reply author: Dave Hottmann
Replied on: 03 Mar 2004 19:15:29

Tom,

You have my permission. I purposely posted here first to work out any bugs. So far so good. I guess you can edit SteamClass if needed. With this done I can work on my three truck Shay.

Reply author: John Page
Replied on: 03 Mar 2004 19:18:47

Dave,

Your tutorial is superb; your video clip is amazing. Thank you for sharing your persistent hard work with the rest of us. You just might succeed in creating a new group of successful live steam engineers yet.

John P.

Reply author: Garry Paine
Replied on: 03 Mar 2004 19:28:06

Dave, your Ruby's performance is amazing. My shay, gearing and all, doesn't run this smoothly. Will you give a class at the Summer Steamup? Thanks! Garry

Reply author: Dave Hottmann
Replied on: 03 Mar 2004 19:30:43

John P,

The video is with lo drag rings. I haven't told all my secrets. Some people would call me crazy for the some of the things I do. Everything is an experiment waiting to fail. I'm a tinkerer, not an engineer.

Reply author: Dave Hottmann
Replied on: 03 Mar 2004 19:41:23

Garry,

I hope to use this post as a handout at NSS. I would like to make it "hands on". Maybe the people I teach can teach others.

Reply author: Tom Farin
Replied on: 04 Mar 2004 07:18:06

Dave,

This is a major contribution. Thank you for sharing it with us.

Can you explain how you hooked up the compressed air to the Ruby. Could an air compressor be substituted. Please elaborate on how you set up the air test.

My Ida is sitting around waiting for this modification. So I'm ready to get going. ;-)

Tom

Reply author: Dave Hottmann
Replied on: 04 Mar 2004 08:18:50

Tom,

If you look in the "Place the engine on blocks" picture with the garden sprayer, and in the video, you'll see the blow gun has a rubber tip. I'm just blowing air in through the fill plug hole. Some people hook their air brush hose to the pressure gauge fitting. Just a matter of compressed air in the boiler somehow with what ever you have.

Reply author: ghmillier
Replied on: 05 Mar 2004 14:47:43

Hi Dave

I did what you outlined, now my Ruby will run in forward on air at 5lb, just slowly moving. What a difference on the track, went from a little bitch to a sweetheart. Runs nice and slow with enough power to make it up the grades. Thank you, thank you, now I like my Ruby.

Geran

Reply author: linuxhost
Replied on: 06 Mar 2004 17:37:49

Dave Hottmann & group,

I consider myself a mechanically savvy person, able to understand anything that has an engine and/or motor. However, after reading your posting on this forum, I'm left with more questions than answers.

Lets start with the first paragraph. In it you state that the Ruby is an outside admission engine in forward, then further on you state that it is an inside admission engine in reverse. What is the common direction when regarding to admission?

I believe that a clearer way to explain the admission of said engine would be..

"The Admission of an engine is determined by the entry ports of the high pressure steam and the exit ports of the exhaust. An outside admission engine has the high pressure steam entering the valve body via the forward and aft ports and the exhaust exiting the valve via the center port. Whereas an inside admission engine, has the high pressure steam entering the valve through the center port and the exhaust, exits from the two end ports".

In the sec. para., you state that on an outside admission the "steam pressure tries to push the piston valve out to the valve block". I assume that you mean "out of the valve block". This sentence only makes sense if you understand the flow of steam through the engine.

It wasn't until I was writing the pervious paragraph that I finally got what you were trying to say.

For newbie's like myself, I think that you really need to go into some more details on the path of the steam. Both pressurized and exhaust.

Not yet owning a Ruby I can only assume that the timing sequence that you laid out, will become clear once the engine is in hand. But with out having a Ruby in hand, the instructions are a bit foggy.

One last question, due to the fact that the connecting rod attaches to the rear of the piston and the rod itself reduces the surface area of the aft piston thus making the two pistons surface area's different, is there a noticeable power difference when the piston is being driven forward as oppose to it be driven aft?

Doug

Reply author: Slick

Replied on: 06 Mar 2004 18:04:12

Linux, you're over thinking the problem.... Ruby as it comes from the factory, runs better backward than it does forward. To cure this, the eccentrics, (see photo's) are turned 180 degrees from their original position, this now makes the engine "inside admission". There is several months worth of Ruby related material on this site, all of it very good and gained by running these little beasts...You will be quite pleased with the enlightenment gained by not only reading all of the info available, but by actually running Ruby.

Jump on in, The Water's Fine!

Reply author: Dave Hottmann

Replied on: 06 Mar 2004 19:14:18

Doug Linuxhost,

There is no common direction for admission. The engine direction change is done by changing the steam flow, not the valve motion.

As far as the exhaust goes, Rubys are not drafted. Exhaust does not run the engine, the admission of steam does. I purposely did not go into a lot of detail. I wanted to keep it as simple as possible and stick with the basics so others could make their Rubys run better.

The aft side of the piston does have a different surface area. If you see a difference in the video clip, you need to remember those are 1/2" cylinders with 1/8" rods. The Ruby in the video is also running on less than 2psig compressed air. Current production Rubys have 3/8" cylinders with 3mm rods. Steam engines have been built this way for a long time. I have no way of measuring the difference.

Sorry about the spelling error. It is now corrected. I don't do this for a living and I don't have an engineering degree. All of my steam knowledge is from reading old books and tinkering. I believe each engine is a book waiting to be read.

Reply author: s-4

Replied on: 06 Mar 2004 19:36:24

Dave, I for one, appreciate your help and the time you have put into this post. I've been haphazardly running my ruby for the last few years now. I think now I'm ready to make another attempt at inside admission, feeling rather confident that i can do it perfectly this time!

thanks again,

Reply author: Slick

Replied on: 06 Mar 2004 19:49:05

What? No Degree? I'd say you have much more than one degree, more than 212 I would suspect!
Sunday tomorrow, time to boil some water.....Steam on Dave, Steam on!

Reply author: Dave Hottmann

Replied on: 06 Mar 2004 20:04:09

Daniel,

If you mean from the "School of Hard Knocks", 212 could be in one day. Do Band-aids count?

Reply author: Dave Hottmann

Replied on: 06 Mar 2004 21:09:28

I would like to suggest to anyone that doesn't understand admission events to run their engine on air as slow as possible and think about "what is needed" to make the drivers rotate. This is how the light turned on for me.

Reply author: linuxhost

Replied on: 06 Mar 2004 22:39:29

Dave & All,

Please don't take my post the wrong way. I was by no means trying to be critical. You made me think of something that I had not given much thought to.

You did a very good job at presenting the operation of the engine and how to correct it's short comings. All that I was trying to do was understand it better myself.

I now understand that on the Ruby, it's the routing of the steam that dictates the direction of the engine and not the valve linkage changing.

I already knew that it is the pressurized steam that drives the piston and not the exhaust. I'm sorry for any misunderstanding about this.

As far as spelling, I'm not the one to talk or be critical. Hell some days I can't even spell my own name.

Now on to the con rods. I understand that all double action steam engines, one side has less square inches than the other, but I was thinking that on the full size engines, the percent of area that the rod takes up would be less than on the models, thus a more exaggerated power unbalance on the models. However after doing the math I see that is not the case.

Once again, If I offended you I'm sorry, it was by no means my intent.

Doug

Reply author: Dave Hottmann
Replied on: 06 Mar 2004 23:19:57

Doug,

Apology accepted and no hard feelings! Do you own a steam engine? If not a Ruby is one place to start without breaking the bank. I have always had a fascination with steam and Accucraft's Ruby got me hooked. It's not as complex as a full size engine, but it is live steam and fits in your hands. This hobby is all about boiling water, running trains, and having fun.

Welcome to mylargescale!

Reply author: linuxhost
Replied on: 07 Mar 2004 03:08:15

Dave

To answer your question, Yes I do own a couple of live steamers. One is an AccuCraft 2cly Shay and the other is an old stationary engine that runs a saw mill. I have on order an AccuCraft C-21, which is due in around the end of April. Also the train shop that I frequent has an "Ida" that they are nagging me about buying. It's the "Ida" that I'm considering using for Tom Farin's Steam Class 2004.

You were talking about using compressed air to dry run the engines, that's the way that I broke-in the Shay. I just made a fitting that fit into the water fill port, attached an air hose to it and connected the other end of the hose to a small regulator and an oiler (then, of course to a compressor). I set the regulator to about 20 psi and let the engine run for about 10 hours. Had plenty of lube oil flowing cause the wall that was next to it, now has a nice big oil slick on it! When it came time to fine tune it, I just adjusted the valve train the way that seemed right. Never really giving much thought as to what was really going on. This is why I was so inquisitive <sp> about your post. I got me thinking about what was really happening.

Doug

P.S. What brand of mill is that in your pic's?

Reply author: Dave Hottmann
Replied on: 07 Mar 2004 07:44:49
Message:

Doug,

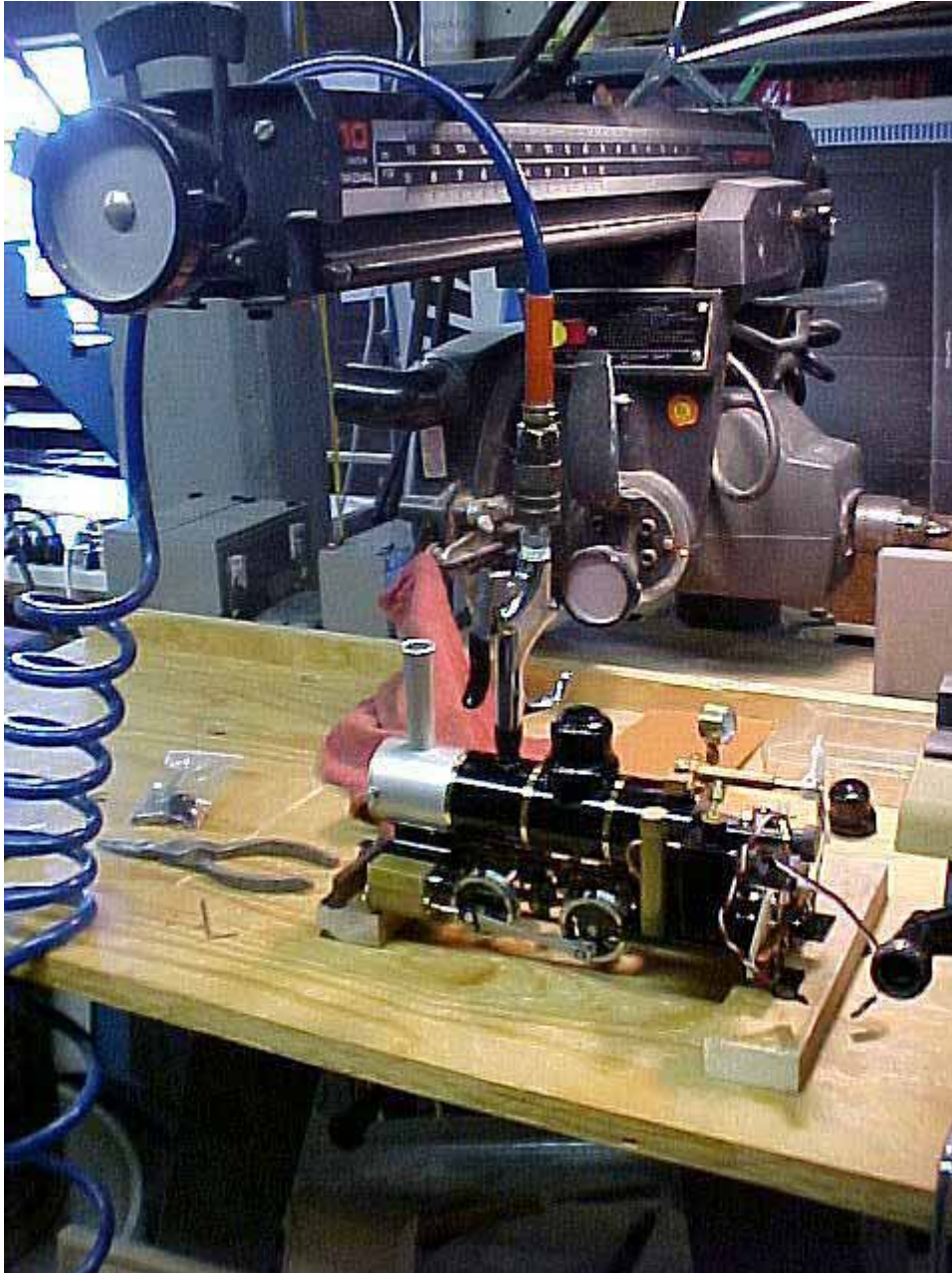
The Shay is outside admission in forward out of the box. They can be easier to change to inside admission and tune because you can see both cylinders at the same time. The C-21 is a piston valve engine like Rubys and Shays. I have not seen a production engine yet, but the prototype was inside admission in forward. In the steam world piston valves should be inside admission, "D" or slide valves should be outside admission.

My mill is a Grizzly. I think I posted the model number in a machining topic here. It's not perfect but it does the job. As I have learned it's personality I can get within .0005" of specs on a good day.

Reply author: foxstump
Replied on: 08 Mar 2004 09:34:09

Greetings All,

Dave, thanks again for your lessons in fine tuning the Ruby. I finally had time yesterday to work through it and she is running like a Swiss watch now. I will attempt to post a couple pix below...





I guess if that doesn't work, one should be able to click on the link - I hope?

Thanks & Cheers,
Paul Stump
Berryton, Kansas, USA, Earth

Reply author: lkydvl

Replied on: 25 May 2004 20:04:41 Dave,

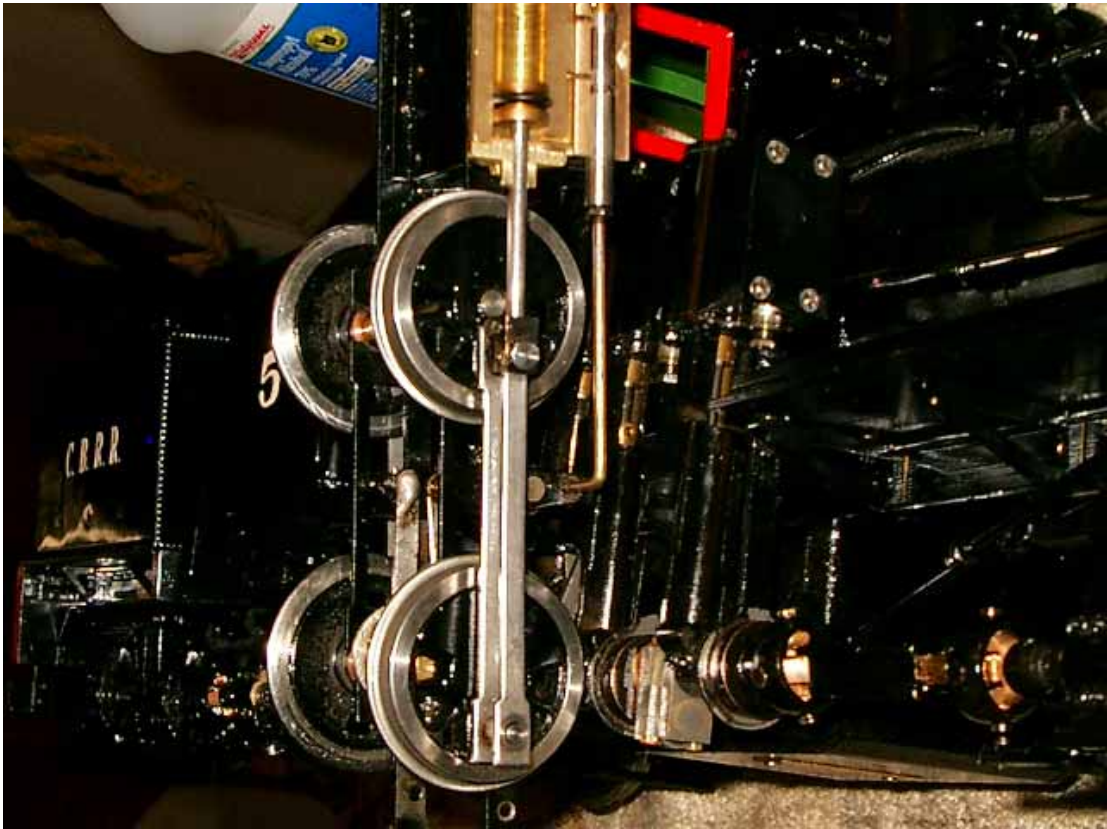
Have you by any chance this same procedure as well laid out for the shay? I'd give at least one of the kids, a dog and three geese to see it as nicely laid out as this was! Nicely done!

Andre'

Reply author: Dave Hottmann

Replied on: 26 May 2004 14:52:53

These instructions will work for Shays. The Shays are basically vertical Rubys with the main drivers being replaced by a crankshaft. Dead centers are at 12 and 6 o'clock. Two cylinders Shays can be easier than Rubys because everything is on one side.



On the 3 cylinder Shays the center eccentric is a split two piece design. Instead of two set screws it has one phillips head screw to hold it's position. You will notice a line where it is split. I use this line to keep track of the eccentric's position when rotating the crankshaft 180 degrees, instead of an allen wrench like on the other eccentrics.



Three cylinders require more patience to air tune. The admission over-lap between cylinders makes it more difficult to see each admission event. Best way to deal with this is turn the throttle down instead of the air pressure.

Another good tip for air tuning any Shay is to take the drive shafts off the crankshaft. This will prevent a bind in the shafts or trucks from giving you a false impression of a bad admission event.

Reply author: lkydvl

Replied on: 26 May 2004 15:28:23

Dave,

Thanks for the new info. Now just to make sure I don't screw this up!.... I adjust all the eccentrics 180 degrees first and tune the valves one at a time. Any particular valve to start with or the one that appears to cause the most "hesitation"?

Andre'

Reply author: Dave Hottmann

Replied on: 26 May 2004 22:16:50

Andre',

You're in the right direction! Start with the one with the most hesitation. I like to check forward and reverse to see if they're both close in performance. This says that the eccentrics are close to center for both directions. Then I adjust the valves for the best forward. Don't be afraid about messing it up. If you get to far off, remember the heavy end of the eccentric needs to be 90 degrees off from the rod journal on the crankshaft.

Reply author: lkydvl

Replied on: 27 May 2004 10:55:54

Dave,

I lubed the Shay up good and disconnected the drive lines. Then turned it slowly by hand to see how things functioned. What a MARVEL!

Could see what sequence to loosen the set screws so I could hold at 12 or 6 oclock and make the 180 degree switch. After that I looked at the valve adjustment. I saw only a single lock nut there. Is the valve rod threaded into the connecting plate/rod? If so how do you hold it when retightening the lock nut?

I must be missing something. Somewhere in my head there is the answer. I can feel it! But its just not coming thru. Kinda like when you are trying to remember someone's name. Just about remembered...nope gone!

Andre'

Reply author: Dave Hottmann

Replied on: 27 May 2004 15:12:07

Andre',

The threads are part of the valve. After loosening the lock nut, rotate the valve with needle nose

pliers. Hold the valve with the pliers while snugging the lock nut. The rear valve is not fun with the cab in the way. It's always a relief when it doesn't need adjusting.

Reply author: linuxhost

Replied on: 29 May 2004 08:01:45

Dave,

As far as the shays are concerned, to change them to inside admission, isn't all that you really have to do is move the drive, bevel gears from the front of the drivers to the rear??

Doug

Reply author: Dave Hottmann

Replied on: 29 May 2004 11:31:44

Message:

Doug,

You could, but it would be a lot more work than rotating the eccentrics. The trucks are not easy to set up right and the drive shafts would have to be changed.

Reply author: Brad Muggleston

Replied on: 13 Jul 2004 23:02:54

Dave,

Thank you for the great write up. I've read it a few times and have some questions. Bit first some background.

I've just finished building my Ruby Kit (Kit #15). On a trial run with a local club and a borrowed pressure guage we found that the safty valve lets go at about 20 lbs. With a borrowed valve I was able to run most of the way around the track to know I'm close.

OK, now for the question - You show how to put the timing 180 degrees off, this I understand but I'm having a problem getting the timing set up correctly in the first place.

Following the instructions with the kit gives me so, so timing (seeing two screws centered around the axle is hard to do). I've tried to back into how to line it up from your article but I'm more visual than written.

I've got a good set up to test it on air. It runs very well on about 10 lbs air. It runs only semi good on steam down hill and will not go up even the slightest grade.

Your pictures let me see that when the driver is lined up over the axles the ring on the valve is just outside the valve block. Where would the driver be in relation to the axle when the ring was just touching the valve block?

Thank you for all the work your doing.

Brad

Reply author: Dave Hottmann
Replied on: 14 Jul 2004 09:35:18

Brad,

Inside admission the line meets the valve block when the main drive pin is at 6 o'clock.

Outside admission (factory) the line meets the valve block when the main drive pin is at 12 o'clock.

As far as valve adjustment goes, the line is a place to start. Final valve adjustment should be done with air pressure without concern how well the line meets the valve block.

Reply author: FH&PB
Replied on: 14 Jul 2004 14:15:53

About setting the timing: in addition to looking at the screws (which I agree is a pretty dodgy way to do it), you can check the positions of the wheels (should be at rear dead center) and the rocker arm that pushes the valve rod (should be straight up). If you have a square in your toolbox, you can use this to measure the height of the main rod and the uprightness of the rocker with the chassis on a table top. That should help you determine whether your eccentrics are set right.

Reply author: Brad Mugleston
Replied on: 14 Jul 2004 21:43:08

Thanks Dave and Vance,

I got my tools out, grabbed a square, pressured up my portable air tank and sat in the sun so I could see better and followed the directions over and over and over again.

Then on 5 lbs of pressure and the throttle just cracked it was running and running and running real smooth. So, I filled it with water, gas and oil. Fired her up and let the pressure build. Once the steam heated up everything she took off around the track - not all the way but pretty good. Then I tried again and it was better but I shut the throttle down at the bottom of the hill I can't see and let the pressure build. Back up to pressure I opened the throttle and she went up the hill that's not there and round the track TWICE!.

I can't wait to get a new safety valve so I'm not losing more steam through the valve than I am the stack.

Thanks everyone, this is great fun.

Brad

Reply author: FH&PB
Replied on: 14 Jul 2004 22:31:47

Hey, Brad, glad to hear that you're up and running now! Moving off at 5 psi is a very good sign. You'll find that she gets smoother and smoother, as the parts bed in and everything gets settled down. If you put her up on blocks on the workbench, you can run her a couple of hours in the evening while you're listening to music or reading a book. After that, she should be smooth as a silk scarf.

Reply author: rrdude

Replied on: 31 Aug 2004 07:06:52

If the C-16 and K-27s are slide valves (D-Links), are the C-21s also? I saw a post in another topic that said the person was going to convert his C-21 to slides.

If the C-21s are piston valves, what is involved in putting in slides? Simply putting on the cylinders from a C16 or K-27?

Reply author: Dave Hottmann

Replied on: 31 Aug 2004 08:33:42

Converting a C-21 to slide valves would be more than just installing K-27 or C-16 cylinders. You would also need all of the valve gear. To change direction on a piston valve engine you only need to change the steam/exhaust flow with a third piston valve. To change direction on a slide valve engine you have to change direction of the valve motion with functional valve gear. If you change the steam/exhaust flow on slide valves, the steam pressure will blow the valves off their seats. The C-21 was produced with piston valves to keep the price low for a big engine. To convert a C-21 to slide valves you would have to sacrifice a C-16 or K-27. The C-16 would be the better choice because of price. The C-16 cylinders also have bigger bores compared to the C-21. The end result could be a very good engine. But the price might exceed a K-27.

Reply author: sschaer

Replied on: 01 Sep 2004 00:57:05

dave

what's the reason to do air tuning rather than fine tuning the valves while under steam ? i assume tuning with steam could give better results. but otherwise i'm not a steam pro like you.

have fun

sandro

Reply author: Dave Hottmann

Replied on: 01 Sep 2004 08:25:17

Sandro,

The advantages of tuning with air is the engine isn't hot and it will run slower on air than steam because the steam will condense in the cylinders. The adjustments do change a little when the engine is steamed and parts expand. The difference is hard to detect. As an example, I thought was 98% perfect on my three cylinder Shay on air, when I steamed it on the dyno I found one valve needed to be adjusted a few degrees by the amp readings. I couldn't see it but the amp meter showed it.

Reply author: lkydvl

Replied on: 01 Sep 2004 10:27:45

Whooooaaaa!

OK Dave run that by me again. How do you use an amp meter to check valve adjustment on a live steamer?

I think I figured it out as I was typing the question. You mentioned "dyno". Can you post pics of it, details of how it was constructed?

How you can tell a valve is out of adjustment with it? Is it a matter of twiddling with each adjustment while on the dyno and watching the amp meter?

Thanks
Andre'

Reply author: PaulGieske

Replied on: 01 Sep 2004 13:08:38

quote:

Originally posted by Dave Hottmann

... As an example, I thought was 98% perfect on my three cylinder Shay on air, when I steamed it on the dyno I found one valve needed to be adjusted a few degrees by the amp readings. I couldn't see it but the amp meter showed it.

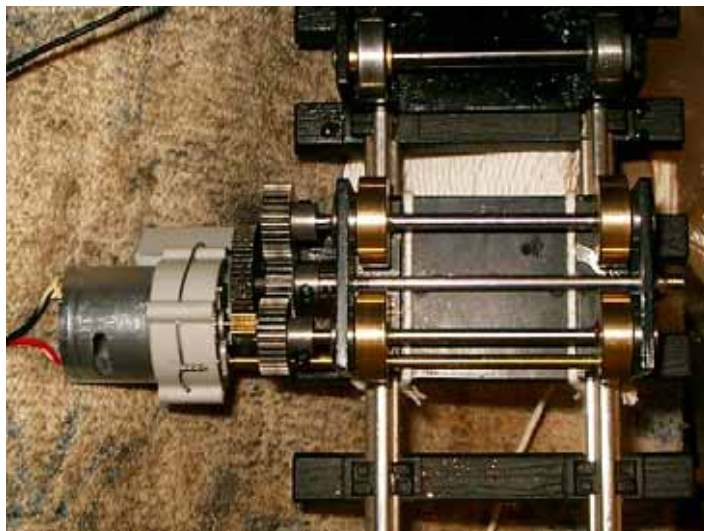
You're just joshing us, right Dave? 😊

Reply author: Dave Hottmann

Replied on: 01 Sep 2004 13:22:35

Paul,

I actually fine tuned my three cylinder Shay on the dyno pictured below. I short the electric motor with a digital amp meter and watched the readings. The late admission showed up as a drop in amps. This is going off deep end.



Reply author: lkydvl
Replied on: 01 Sep 2004 15:57:05

(shaking head here)

Gees Dave...when you going to let the rest of us catch up?

Did you scratch build that or steal the gearing and motor from another application.?

Andre'

PS Keep it up I LOVE seeing your projects !

Reply author: Dave Hottmann
Replied on: 01 Sep 2004 16:26:52

Andre'

I thought about building a water dyno for a long time then it dawned on me I could measure an engine's performance with an electric dyno. This dyno is built from an Accucraft tread mill. I duplicated the bearings in brass (next time steel) and installed R3 bearings in the frame. I added a third shaft for the primary gears, the gears are from an RC car. I then added an airplane electric motor (6.6 ratio) for a generator. I short the motor with an ampmeter and parrallel a volt meter. Amps X Volts= Watts. Watts divided by 746= horse power. With these little engines it's micro hp. The only engine that has over taxed the dyno is the prototype GS4. The motor would get hot so I cooled it with a moist paper towel.

Reply author: FH&PB
Replied on: 01 Sep 2004 16:32:29

Too much, Dave!

You know, they're making convection radiators to cool hot-running computer chips now. Just the thing for your overtaxed dyno!

Reply author: PaulGieske
Replied on: 02 Sep 2004 13:32:27
Message:



You are the Dude! Wow!

Reply author: Dave Hottmann
Replied on: 02 Sep 2004 15:53:13

Paul,

I'm really just a nut case.

Reply author: Scottychaos
Replied on: 26 Nov 2004 09:34:17

ok, im trying to air-tune my Ruby! 🤖🤖

I did the inside admission adjustment, and the engine runs smooth as silk in *reverse*! (that's *inside admission* reverse, with the johnson bar lever toward the *front* of the engine)
purrs along like a little kitten!

but.. in inside-admission forward, with the johnson bar level pulled back, its VERY rough and choppy..
I'm reading Dave's adjustment instructions, and I understand what he says to do if it hesitates at 3 and 9'clock..
but mine are hesitating and stopping at 1 and 7o'clock!
(right side drivers, in forward)

on the right side, the etch mark on the right valve touches the block when the crankpins are at 6 o'clock.

on the left side, the etch mark touches when the left crankpins are also at 6o'clock..
is that right to start with?

"rocker up" - when the rocker arm is pointing straight up.
"rocker forward" - rocker arm facing the front of the engine.
"rocker back" - facing the rear of the engine.

(I thought it important to determine some terms! because I wrote out the description below using "rocker right" and "rocker left".. but on one side of the engine "rocker right" is facing the front, and on the other side "rocker right" is facing the back!
that could be confusing.. hopefully this way we can keep things straight..)

I'm not sure if the rocker arm is properly adjusted anymore either..
on the right side of the engine, the rocker arm is "rocker up" when the crankpins are at 9:00.
then as we rotate forward, the rocker is fully "rocker back" (pointing toward the back of the engine)
when the cranks are at 12:00.
then the rocker is back to "rocker up" at 4:00! (that's probably not right, should be 3:00 I assume?)
then to "rocker right" at about 7:00.

so with that hopefully not too confusing explanation ;)
can someone tell which way I should adjust?
I have tried just messing with the valves, but its not helping..
especially since I dont know which way I should be going.. 🤔
thanks,
scot

ooh, one other thing.. when the drivers hesitate and stop at 1:00 and 7:00, air is still coming out the exhaust!
with the drivers stopped..
is that supposed to happen?

Reply author: Dwight Ennis
Replied on: 26 Nov 2004 09:48:14

Sounds to me like you have the eccentrics 90* off Scot. I'm no expert at this, but the power stroke on either side should begin (valve all the way forwards or backwards) with the drivers at 3 and 9 (or just past 3 and 9 actually), NOT 1 and 7. Unfortunately, Dave is currently recovering from hip surgery and hasn't been on the boards much of late.

BTW, when it's inside admission in forward, it's outside admission in reverse and visa versa.

Reply author: Scottychaos
Replied on: 26 Nov 2004 10:00:03

thanks Dwight..
interesting.. I don't know how I could have got off 90 degrees!
but I suppose anything's possible! ;)
I put the engine together first according to the Ruby kit instructions,
then did Dave's instructions for changing to inside admission..
holding the eccentrics still and rotating the drivers 180 degrees..
hmmm..

ok, well lets try to make this simpler..
the "etch mark" on the valve cylinders.
that mark should just touch the block when the valve is as far forward as it goes..
that etch mark should never go *inside* the block right?
well my valve etch marks, on both sides, touch the block when the cranks are at 6:00..
thats wrong?
it should touch at 3:00 or 9:00 instead?
Scot

Reply author: Dwight Ennis
Replied on: 26 Nov 2004 13:46:00

Scot - I was talking to Dave Hottmann this morning, and I mentioned your post. He said he sent you an email with his phone number. My best advice is to call him and get it from the Master himself! hehehe He can answer all your questions a LOT better than I ever could, plus things like this are always best answered either in person or on the phone where responses are instantaneous. 😊

BTW, it's entirely possible, if not probable, that the hesitation at 1 and 7 you mention are coming from the opposite side from the one you're looking at.

Give Dave a call. He's bored out of his mind and loves to talk trains. 🚂

Reply author: Scottychaos
Replied on: 26 Nov 2004 17:10:50

ok! solved *that* problem!

thanks Dwight and Dave.
(I gave Dave a call..very informative! thanks Dave! :)

Dave and Dwight were right.. my engine was smooth in reverse but rough in forward,
they said that points to the eccentrics, not the valves.
So I totally loosened up the eccentrics and started over.
I adjusted them properly according to the Ruby kit instructions,

outside admission, hooked up the air, runs good! :)
not great, but ok..
then I did the 180 degree switch to change to inside admission,
applied some air.. ugh.. VERY rough!
so I tried adjusting the eccentrics again..
I discovered the problem was the way I was rotating the eccentrics 180 degrees..
I wasn't doing a good job of holding the eccentrics perfectly still as I rotated the drivers.. so when I
tightened them back down, they were off..
I'm not sure why.. I just wasn't holding the allen key steady enough I guess.. too much variation
worked in.. it wasn't an exact 180 degree switch.
but! found a cure!

with the chassis **Upside down**, the Ruby instructions tell you you to align the eccentrics by rotating
the wheels on one side until they are at rear dead center, piston rod out as far as it will go. then, hold
the drivers in that position and rotate the eccentric (for that side) around until the set screws are
facing up and centered.. then tighten.
repeat for the other side.

well, I discovered that with the boiler off, you can do the exact same procedure, but align the eccentric
set screws "face up and centered" with the chassis **rightside up!** 🤪
gave me much better alignment that way.
but, gotta have the boiler off to do it that way though..

ok! so now she is somewhat smooth in forward.. not great, but acceptable.. I can see some hesitation
at spots, so I know it can be adjusted better. but it looks pretty good, keeps running to quite low
pressure!

I think I'm going to finish putting the boiler together and fire her up! then try the fine tuning some
more after she is broken in a bit..

I don't think an accurate adjustment can be done on a un-broken-in engine..

I think she is good enough to fire up! 🤪

Scot

Reply author: Dwight Ennis
Replied on: 26 Nov 2004 18:34:12

Glad you worked it out Scot.

Dat Dave be da *man!!!!*

Reply author: wchasr
Replied on: 29 Nov 2004 06:13:00

Scot,

I'm not through all the posts since last week yet but what did you end up using for an airsource? I'm
planning on using a badger Airhose form my Cheap \$10 Airgun set up from my R/C days and a can of
proppellant. That should work although I'm concerned that the pressure my be too high?

Chas

Reply author: Scottychaos
Replied on: 29 Nov 2004 06:41:06

Chas,
I ended up getting one of those garden "pressure sprayer" things from home depot.. they have them in the garden section, you "pump them up" and they build up some air pressure..works good!
and it has a valve so you can control the air flow..handy.
this isnt the exact sparayer I got, but similar..
home depot has them for around \$15.

http://www.homedepot.com/cm_upload/HDUS/EN_US/asset/images/eplus/130306_3.jpg

then I got a badger airbrush hose..
the airbrush hose fits onto the steam input line of the Ruby, with the boiler removed.
but..my airbrush hose must have been sitting around a long time before I bought it because the gasket was old and cracked..it leaked.
so I made a new gasket out of electrical tape.
then! I needed a fitting to connect the airbrush hose to the pump hose, so I used an old piece of brass tubing, put the ends of both hoses into the brass tube, and sealed up the connections with electrical tape! (a LOT of electrical tape!)
I probably ended up using half a roll of tape before I finally had all the air leaks sealed up!
not the most elegant solution, but it ended up working in the end.

now that the boiler is on my engine, im going to go to a local "home brewing supply" store and look at rubber stoppers..

(I have bought some before for my aquarium..)
they sell various sizes of rubber stoppers with holes through them..
im going to look for a stopper that will fit in the water fill hole of the boiler, and stick the air line through the hole in the stopper..should have tried that in the first place! ;)

http://www.labplus.co.kr/labsafety/product_images/L1042/L104298.jpg

Scot

Reply author: Scottychaos
Replied on: 29 Nov 2004 07:16:28
Message:

here is a strange random thought..(for anyone)
is it possible that accucraft changed the Ruby kits so they are now inside-admission as built?
and then, when I made the "inside admission 180 degree switch" I actually converted it BACK to outside admission?

I know that isnt likely..but my engine runs SOO much better in reverse than it does in forward, and I did the switch!

How can I actually tell if im set up inside or outside admission?

thanks,
Scot

Reply author: David Fletcher
Replied on: 10 Dec 2004 20:16:24

Chaps,
I am doing the Inside admission change to my FW loco. All the above makes perfect sense from a operational standpoint, but like Scot, I get the thing to still run better in reverse than forward after the

inside admission change.

There are a number of posts above that try to suggest where various parts should face, and frankly they seem to conflict. When I set the screws to the eccentrics, centred and facing up on the eccentric (when the drive wheel is with crank dead centre facing to cylinder for inside admission), the eccentric crank is not vertical per Vance's suggestion...nor is it at when the crank is dead centre, out. yet she runs great in reverse.

There are a number of things which would help me to fine tune this thing:

1- In Inside admission set up, when the driver crank is dead centre facing out...piston all the way out, should the eccentric on the axle be facing 90 deg up or down of Inside admission, relative to that crank position?

2- Should the eccentric on the axle be absolutely 90 deg off relative to the crank, or 85 deg or 110 deg etc? Is should it be a perfect squared set up, or slightly out? Dave talks about the crank being just beyond centre when admission starts..but I dont know where admission starts when looking at the loco from the outside.

3- For inside admission, at what point of the wheel rotation in forward motion does the line scored into the slide valve, move in and touch the valve chest?

If I can clear that up, I'll know whether the FW loco was made with Inside admission in the first place, and know where the parts should really move to.

Finally I have never touched the nut on the slide valve and adjusted that at all....yet I note on this Rudy that the valve crank DOES not rock back and forth equally about the vertical..well it does on one side, but not the other!. On the engineer's side it moves from a point just forward of vertical, to a longer distance to the rear of vertical...is this normal for Ruby?

I know Dave is unable to help so much right now, but anyone with a well tuned Inside Admission Ruby can check the setout of their motion and let me know where the parts face.

BTW on air, even before I messed with anything, she never ran smooth, so I cannot tell from the original settings how things should be. Additionally given I've only run her on air, and there is not steam expansion running air..she should run just as well regardless of which way the air is admitted?

Thanks chaps,
Awaiting some geographical advice!

Fletch.

Reply author: David Fletcher
Replied on: 10 Dec 2004 21:11:28

OK, I have it running equally well both ways now. I believe the following are the conditions for Inside Admission.

When piston is all the way forward, and crank is dead centre forward, the eccentric crank for that wheel is 90 deg down.

As Vance says, the eccentric crank should be vertical when the crank is at dead centre forward or back, but doesn't look like Ruby QA always allows for this...mine is fine on one side, but out of vertical on the other...but the slide valves move the same on both sides regardless.

in order to make mine run smoother I had to adjust the slide valve on the engineer's side to compensate for the valve crank being out. I tried to move the valve crank by loosening that grub screw there, but upon tightening it would always force it's way back to the original position..perhaps

there is a flat spot on the crank, so only the only adjustments can be one at the slide valve and the eccentrics on the axles.

What ever, she's running good on very low pressure. It does not run with an even beat however, so I don't know if I got it absolutely right, or whether even in an ideal set up, there are weak spots in the typical wheel rotation.

I think I might fire her on these setting and run her in a bit. to see if she smooths out some more. She's running more like what I'm used to seeing.

Thanks chaps,
Fletch.

Reply author: David Fletcher
Replied on: 10 Dec 2004 21:16:29

In Setting up R/C for this, I note Kevin's throttle arm length to the RC servo is very short, which means a tiny movement of the servo will rotate the throttle valve quite a long way. My question is...typically, how far does one need to rotate the throttle to get the full range of operation needed..is it only 90 deg, 120 deg, 150 deg? Or does the throttle effectively become wide open at only 10 deg open?

I was kinda expecting to rotate the arm about 110 deg, with the links to the thottle about 15mm out from the centre of the throttle pivot.

Any suggestions?

Fletch.

Reply author: Dave Hottmann
Replied on: 10 Dec 2004 21:22:06

Fletch,

With the piston dead center out the eccentric will be up 90 degrees. The eccentric may not be truly 90 degrees off of dead center. Rotating the eccentrics 180 degrees is only the beginning of the process. After rotating the eccentric 180 it's time to run the engine on air and pick the worst admission event and adjust the eccentric and/or valve as needed. An eccentric needs to be adjusted if the push/pull admission events are equal but late or early. A valve adjustment is needed if the push/pulls are not equal. If the engine runs better in reverse it usually means that the eccentric/eccentrics need to be advanced. The scribe marks on the valves should only be used for a starting point and should not be taken seriously during air tuning. It's more important that the passages inside line up at the right time than where the scribe marks are. Even though there is no steam expansion when running on air it should run better in forward inside admission after tuning is completed. Remember when air tuning that there is actually two steam engines sharing an axle. One side may influence the other but only make small adjustments on one side at a time and test with air between adjustments. Very seldom will an engine run perfectly smooth so don't drive yourself crazy. I tune for the best forward and live with a not so smooth reverse. If you can get it to run at 1 rev/second on 5-10 psi you've done well for your first time. The best I have ever done is 1 rev/3 seconds at 2.5 psi. This can only be achieved about 2am on a well broke-in engine.

My RC full throttle is around 90 degrees.

Reply author: David Fletcher
Replied on: 10 Dec 2004 22:25:48

OK Thanks Heaps Dave, I now know I have the eccentrics set for inside admission. I'm running without stalls on about 2revs per sec on around 5PSI..but it's so hard to really tell. I'm running her as slow as possible, and she seems to run so long as there is air in the boiler of any sort. But the rotation speed is not constant, she has a fast section and a slower section within each rotation. I think at this point, rather than go nuts, I'll work her a bit on steam and see what's what.

My problem is I just dont know how to visualise a late or early event!

90 Deg on the throttle, right, that sounds good.

Thanks mate,
Excellent!
Fletch.

Reply author: Dave Hottmann
Replied on: 11 Dec 2004 11:25:45

Fletch,

A late admission is when the driver stalls or pauses after piston dead center. These are easy to see. An early admission is before piston dead center and causes the driver to hesitate or stall when the piston tries to push/pull the driver backwards for a brief moment and this is not desirable. These are hard to see and can mimick a bind. It's best to have small hesitations after every piston dead center on air. If the admissions are not late enough on low pressure air they can be too early with steam pressure. To keep from having the eccentrics advanced too much make sure reverse still works. Not all the admissions will be equal, one or two can be stronger than the others. I took advantage of this on the GS4 and timed the axle pump compression stroke to the strongest admission event. This way the engine ran smoother with the axle pump load than if it was timed to the weakest admission event. Something else that might help you fine tune is to raise the air pressure to 10 psi and adjust the flow and driver rpms with the throttle and load the drivers lightly with your finger. This can be a better way on a new stiff engine. The advantage to air tuning is to run the engine slow enough that you can see the admission events and you won't burn your fingers. To go way off the deep end you'll need to build a dyno so you can tune under steam and load.

Good luck and don't stay up too late.

Reply author: David Fletcher
Replied on: 11 Dec 2004 14:29:40

Thanks Dave...now it really is all falling into place. I have late Admission. It runs, without stalling on 5PSI, but hesitates, or slows juat after dead centre...so Its basically waiting for the valve to catch up and let the steam into the correct spot before moving on! Its only a slight hesitation, because she wont stall. I think I should fire her before messing any more. She runs in reverse, but not as well as forward.

My guess here is that when you tune the valves so that she runs equal well both ways, she's actually not perfect either way..so moving the eccentrics are couple degrees either way and she'll smooth out for forward or reverse, but not both...therefore set for optimum forward, and live with a slightly rough reverse.

I need to see what happens when there is 40PIS in there, with expanding steam. I'd do it today, but I'm still tracking down steam oil..all my sources are just too far away from right now! Its not something easily bought here.

Fitting R/C, all worked well..but I'm having real trouble with the arial. The moment I start to coil up the end of the wire onto a wood board, the servos start to jitter...this really annoys me..range is crap. Yet this system is for R/C cars. I'm beginning to wonder whether there is a break in the copper of the arial wire someplace, and it's just dry touching in there?

I cant know whether the arial is working right or not. But If I leave the arial straight out back I can walk 20 metres away with no problem. The moment I try to wind the thing around anything on the loco, it starts to buzz.

Fletch.

Reply author: East Broad Top

Replied on: 11 Dec 2004 14:34:11

I've found 110 degrees on the throttle to be about all that is needed to open it up. The servo arms that come with the micro servos are rather short. I drilled a hole in the throttle control arm as close to the mounting ring as possible, so to get maximum movement from the relatively short movement of the servo arm (around 5/8" total travel). Under a rough air test, I found that the movement of the servo was sufficient, and that was even with me increasing the taper of the throttle valve for better control. I haven't run it under real conditions yet, so we'll see how she really does in a few weeks.

One other thing to watch when adjusting the timing is the position of the piston valves themselves. I found myself fiddling with them as much as the position of the eccentrics to get things running smoothly. The trick with that is to find where the mechanism is binding, then tap either forward or backwards lightly on the piston arm and see if that sets things going again. If it does, rotate the piston valve on the threaded rod forward or back until it runs smoothly. Then, fight with trying to hold the piston valve in position while locking the retaining nut against it *without* changing the position of the piston valve in the proces.

Later,
K

Reply author: David Fletcher

Replied on: 11 Dec 2004 15:41:53

Now that is a cool idea Kevin!

I ended up setting up my R/C much like yours, and likewise found the operational range to be good around 90-110 deg, with the arm connection close to the pivot of the throttle. This reception range issue however has got me beat.

Fully charged batteries, checked all connections etc..even with all the equip laying out flat on the floor outside of the loco, I get jitters from the servos when I rock the loco, or move around with the transmitter in hand. I have two receivers and tried them both..no difference. I would never trust a flying object to this kind of R/C rubbish. The metal of the loco should not create that much interfrance..especially when it makes no difference whether the stuff is inside the coal bunker or not. Either this is how it is supposed to be, or there is a dry joint in the electrics somewhere..QA, or what I don't know.

I'll take it back to the R/C and train shop 20km from home and see what they think is the problem.

Fletch.

Reply author: Dwight Ennis
Replied on: 11 Dec 2004 19:27:10

Fletch - let me get this straight... you say even you get jitters on the servos when you rock the loco even with all the R/C equipment OUTSIDE the loco?

Sounds to me like you have glitching my friend. PCM time? 😊

Reply author: Dave Hottmann
Replied on: 11 Dec 2004 20:57:02

Fletch,

Sounds like you have NORMAL glitching. FM is better than AM. Some engines are "noisier" than others. There is also noise from power lines, fences, and wind in bushes and trees. My Ruby-Garratt is my worst offender. The engine could be perfectly still and the servo would go nuts at the slightest touch. The SAM2 servo smoothers from Sulphur Springs work very well but the servos response is slow. RCS systems are glitch free but are also slow response. My K-27 is getting PCM. I purchased a used aircraft radio on ebay and tried it. Truly glitch free with quick response. I then sent the radio to Futaba to convert it to ground. This was not a cheap as originally quoted because of the age of the radio. I'll be into my used radio as much as a new 9CAP. If I could back up the calendar I would start with PCM even for a Ruby. My engines run smoother, longer, and wreck less when there is no glitching.

Reply author: David Fletcher
Replied on: 11 Dec 2004 23:11:23

Well thats what I have!!

Bloody glitching! There would be quite a lot of interference sources in my area. I'm running an FM set up, 36MHz, as recommended by the local R/C specialists. I need to ask about PCM. I'm not an expert in this at all..infact I've never even looked at R/C before! What exactly is PCM...some kinda Pulse modulation? Man I gotta watch more Star Trek...

I'm not big on Borg technology either.

OK more research!
Fletch.

Reply author: Dwight Ennis
Replied on: 11 Dec 2004 23:35:16

PCM is a digital radio in which each control signal sent is preceded by a digital 'header' which tells the receiver that the following signal is a valid control signal. Anything not preceded by a valid header is ignored, so glitching is eliminated.

The initial investment is, as would be expected, more (\$369.00 now at Tower Hobbies including a \$30.00 rebate), but the transmitter only needs to be purchased once. Subsequent locos only need additional receivers and servos. The Futaba 9CAP, which Dave mentions, can remember the preprogrammed servo settings for up to 14 individual locos (with an add-on memory module which I got free when buying from Tower Hobbies). It has a digital LED readout and up to 9 channels, and most importantly, is glitch-free. It's designed by Futaba for ground control - mostly for combat robots and the like, where performance is everything.

Reply author: TrotFox
Replied on: 17 Dec 2004 23:08:15

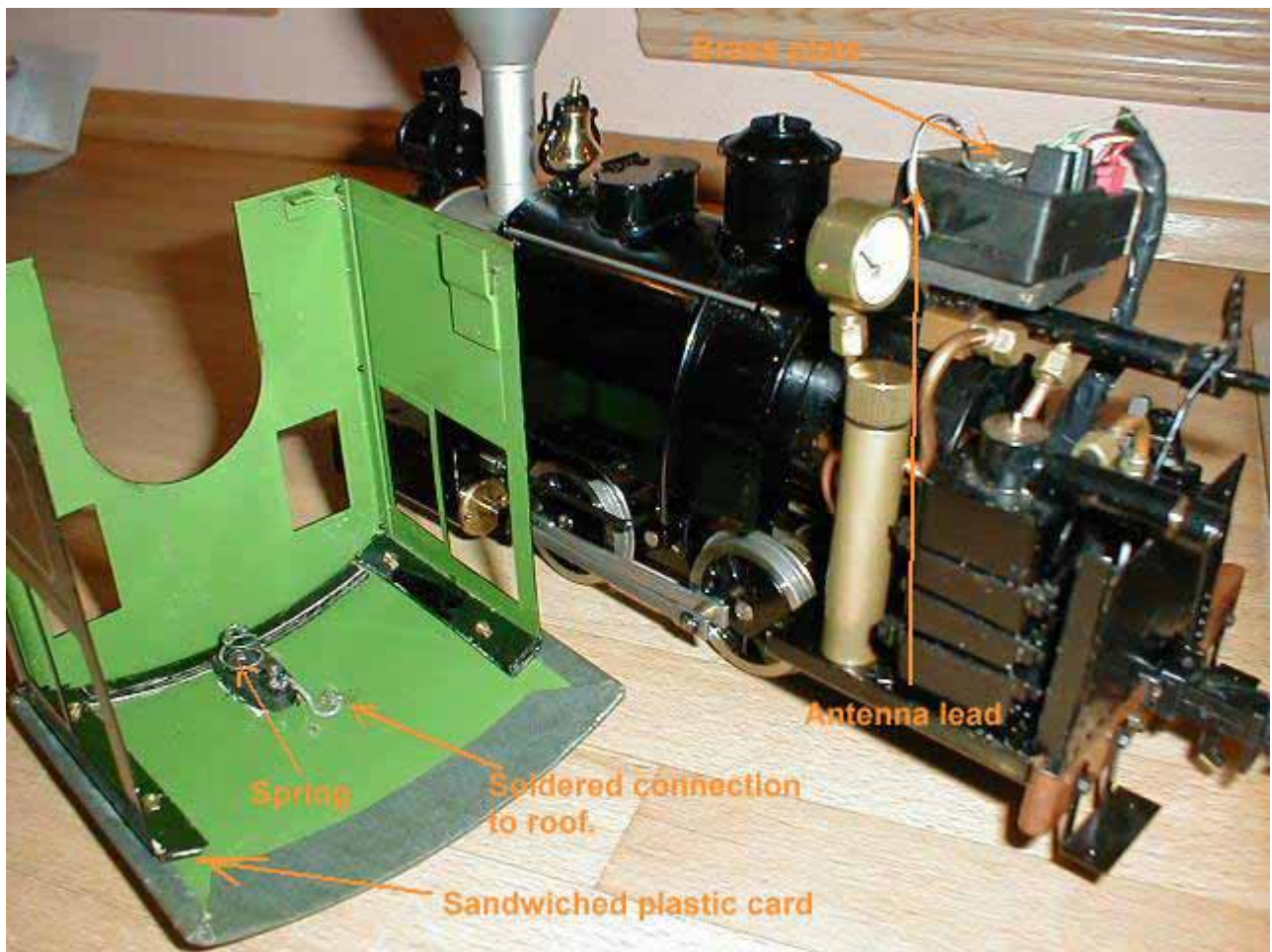
Fletch,
Some of my R/C cars will go nuts when I touch a screwdriver to the carb adjustments. They even have full length straight antennas!

It's a pain unless you can shell out the big bucks for a PCM system. :(

Trot, the switchable, fox... (as in yard switching... when the engine is running. : ()

Reply author: grumpfuttock
Replied on: 18 Dec 2004 19:57:24

Hi Fletch, I am not an R/C expert, but the coiled up antenna lead may be the problem. I had awful glitching on my first Mamod loco many years ago, it was so bad that after a month of frustration I nearly threw it in the dustbin. As a last resort I went against the R/C manufacturers advice of never shortening the antenna lead, and chopped most of it off, glued a thin layer of plastic card to the cab roof, and covered the whole roof area with thin brass plate, that was my antenna, and it worked wonderfully. Only running past the metal clotheline pole caused a slight servo judder. Below is a pic of a similar setup on my "Ida".



If all else fails you might like to try a similar solution as a last resort.
Explanation: - The receiver sits on a piece of hardboard (to reduce heat transfer), which is clipped to the top of the steam turret. The antenna lead comes out from the side of the receiver and a small brass plate is soldered to the other end of the much shortened lead. The brass plate is then glued to the top of the receiver. I removed the cab roof, and enlarged the holes at the top of the cab sides

which accept the screws to hold the roof in place. I then glued 2 strips of plastic card to the top of the cab sides, and drilled 4 new holes at the original size and position through the plastic strips. The roof's screws and nuts are now in contact with the plastic, thus insulating the roof from the cab. Because the roof was now slightly raised I glued a strip of black plastic card at the front of the roof to fill in the gap between the top of the cab front and the roof. The last jobs were to glue a piece of wood to the roof (positioned above the brass plate), attach a spring from an old battery pack (to make contact with the brass plate on the receiver), and solder a short wire from the spring to the roof. It has worked for me, I mostly run with the transmitter antenna unextended, but I do get some glitching on "Ida" when the batteries get low!

Reply author: HeliconSteamer

Replied on: 02 Mar 2005 21:29:02

The Allen head screws on my eccentrics seem to have lost their heading, or the material on the rim of the screws has been flattened to the point where I cannot release the eccentrics to reverse admission. What are my options here??? I don't have access to a machine shop and have very little experience with this type of thing. Any ideas will be greatly appreciated. Would there be a way to say, just extract the screws and find replacements from Accucraft or another supplier? I just need some help here. If it helps any, she is a first batch Ruby.

Colored valve timing diagram

Original Topic URL: http://www.mylargescale.com/forum/topic.asp?TOPIC_ID=37632

Topic author: Brooks

Posted on: 18 Mar 2006 11:00:04

Here's a color diagram to help you get your Valve Timing and Valve Position correct. The black is the wheel, the grey is the rod, the black dot is the crankpin. The black arrow is direction of wheel rotation (counter clockwise here). Noting where the crankpin stops or hesitates in relation to the colored arcs will tell you whether your valve Timing or valve Position need adjustment.

Red Arc - timing needs to be advanced, so rotate the eccentric a little bit in the same direction as the wheel rotation eg. counter clockwise for this diagram.

Blue Arc - timing needs to be retarded, so rotate the eccentric a little bit in the opposite direction as the wheel rotation i.e. clockwise a little bit

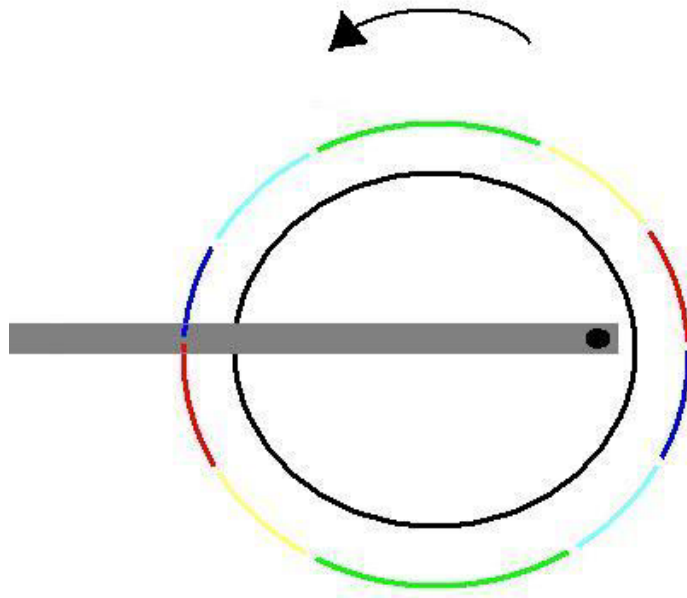
Green Arc - the problem is on the other side of the loco.

Yellow & Light Blue Arcs - Probably timing is ok, but the valve position needs adjustment. Most likely, the crankpin, in this case, will not act symmetrically. It will stop in one yellow arc, but not the other for instance. In fact, non-symmetric behavior even in the other arcs is probably evidence of a valve position problem, on top of the timing problem.

Adjusting valve position is easy if you can get the top off the valve chest: the valve should be in the center of the chest when the eccentric is up or down, i.e. in the 12 o'clock or 6 o'clock position. If you can't see the valve, you can either figure out before hand which way the valve needs to be moved (towards the front or towards the back), or..... Since that makes my brain hurt, I just use trial and error, moving it a bit forward and seeing if that helps, etc.

What makes it hard, with Accucraft piston valves anyway, is that forward and reverse use opposite inlet events. For outside admission (slide valves exclusively, either forward or reverse with Acc. piston valves), the valve should precede the piston. That is, the valve should move to the back a little before the piston starts to move toward the back. With inside admission (real loco piston valves and Acc. "the other direction"), the piston should move back before the valve. <<Actually the valve always has to move first to uncover the piston port, but it's just easier for me to think about the setup this way, sort of like saying "the sun comes up in the morning" rather than the truth "the horizon goes down" >>

Of course you can have both timing and position problems at once. Dave Hottmann says fix the worst problem first, and then tackle the rest. The diagram may help you figure out which one to tackle first.



Replies:

Reply author: Brooks

Replied on: 18 Mar 2006 15:54:05

For a 3-cylinder loco, the arcs are still correct for each separate cylinder. Of course you can't equate the black circle with the Shay wheels, but have to superimpose it on the Shay crankshaft. It's a job that would make Escher faint :-). The biggest problem is in accurately plotting the hesitation(s) in the first place; the other 2 cylinders will take up the load and make it harder to see the hesitation due to the 'bad-valved' 3rd cylinder. If all else failed, I would try to temporarily disconnect one of the cylinders from the crankshaft.

Of course, this masking happens with 2 cylinder locos too, but with low enough air pressure, and/or brake action on the wheel (ie your finger), you can probably make the hesitations apparent with a 2-cylinder loco.

Your 3-cylinder Shay should have come with a parchment service contract, the signing of which, in blood, will enable you to contact the [Lower Level Help Line](#).

Reply author: Chris Scott

Replied on: 18 Mar 2006 22:05:12

If I remember correctly the Shay eccentrics tune pretty much like Ruby's it's just the orientation can throw you off. Dave Hottman built a thread on how to tune the 2 and 3-Cyl. Shay's eccentrics. As I remember, Dave began with the basics of showing the similarities between Ruby's eccentrics being horizontal and the Shay's vertical. Once Dave's orientation sinks in the application of the Ruby's eccentrics tuning vs the Shay seems pretty straight forward for adjusting the Shay. I cannot give you the specific thread you will need to search for it, unless Dave or someone else knows the specific one.

Ruby 2 Dual Adjustable Eccentrics????

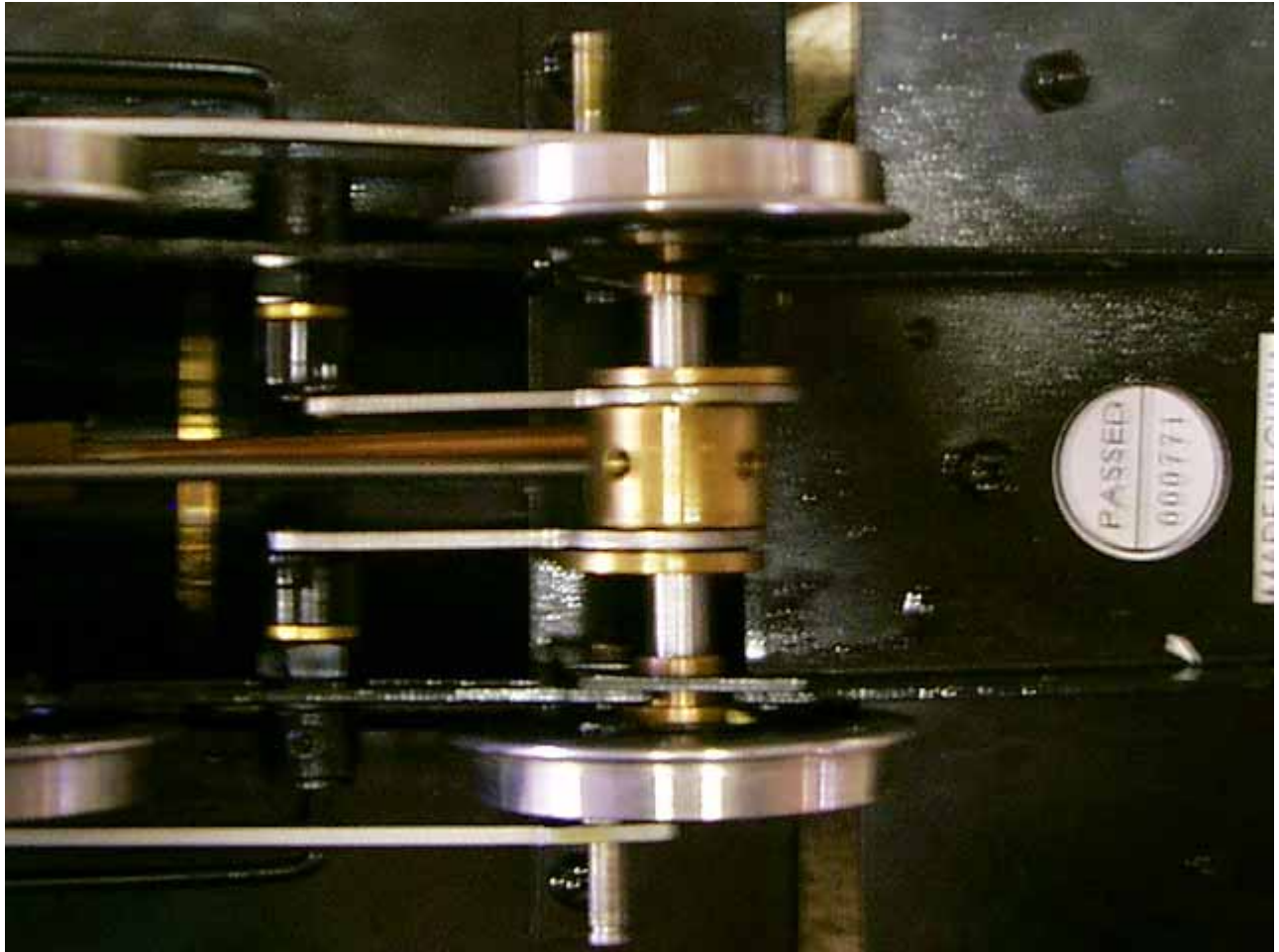
Original Topic URL: http://www.mylargescale.com/forum/topic.asp?TOPIC_ID=37741

Topic author: Dave Hottmann

Posted on: 22 Mar 2006 19:24:08

It can be done. Basically I hacksawed the single mount in half, drilled and tapped new set screw holes, and shortened the screws that hold the eccentrics to the mount.

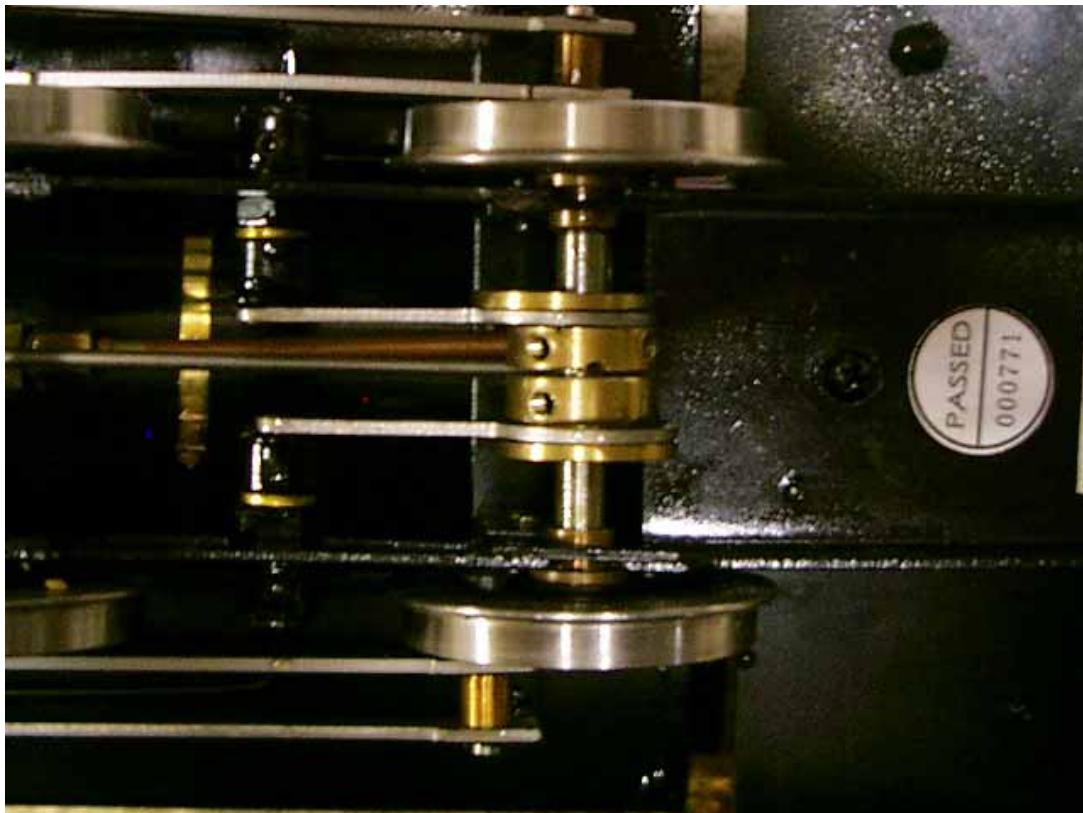
Here's the OEM single eccentric.



Here's the OEM single eccentric in pieces.



Here's the finished product.



Forward is nice and smoooooth now 🤖

Replies:

Reply author: Bob Starr
Replied on: 22 Mar 2006 20:55:58

At least they allowed enough "meat" in between the eccentrics to allow that to be done. Did you cut it on the lathe? Lots of times I will do something like that by using my jewelers saw with the teeth facing forward and cut on the lathe. Oh that's right, I HATE cutoff tools! Good job Dave

Reply author: Brooks
Replied on: 22 Mar 2006 22:15:51

Thanks so much for finding a cure, Dave. Makes me feel much better to know that the single can be turned into a double.

Reply author: Dave Hottmann
Replied on: 23 Mar 2006 03:05:28
Message:

Bob,

My smallest cut off tool would have removed too much meat. I started with a dremel and that got too hot, so I just clamped in a vise and used a hack saw.

Reply author: Bob Starr
Replied on: 23 Mar 2006 07:56:28

quote:

Originally posted by Dave Hottmann

Bob,

My smallest cut off tool would have removed too much meat. I started with a dremel and that got too hot, so I just clamped in a vise and used a hack saw.

Dave,

That is why I like to use the jeweler's saw method, you can regulate the thickness of your cut by using different size blades. Altho, it gets a bit touchy when you use really thin blades. Just always mount the blade with the teeth facing forward; opposite of the way you usually place a blade in a jeweler's saw. Using a hacksaw for bigger things works well too. Another method that I use for making precise, thin, cuts is to use an old cutoff saw; the ones with teeth. Depending on the size of the blade, I will either halve or quarter it and then braze it to a piece of 1/4" stock. I can then grind the resulting edge into a cutoff tool.

Reply author: Ray C.

Replied on: 23 Mar 2006 09:49:05

quote:

Originally posted by Bob Starr

[quote]Originally posted by Dave Hottmann

Bob,

My smallest cut off tool would have removed too much meat. I started with a dremel and that got too hot, so I just clamped in a vise and used a hack saw.

Hi Bob,

That's the same technique I've been using for years! Anything over 1/2", and it works really well. Then, if one wants, you can tidy up the cuts by facing the piece. Too cool! (See you Saturday? I've got a silver brazing conundrum to ask you about..)

Reply author: David BaileyK27

Replied on: 23 Mar 2006 10:15:01

I have just tested my Edrig chassis which has a one piece eccentric, it runs fine in forward gear but not at all in reverse, looks as if I will have to cut my eccentrics in half.

Why is Accucraft producing this ? as there must be an error in the machining of the eccentric assembly, I regards this as a retrograde step and may put customers off of buying engines with this set up.

David Bailey

Reply author: FH&PB

Replied on: 23 Mar 2006 14:54:04

Why and *when* did they start doing this? My three Rubies all have twin eccentrics, the last a kit built about a year ago. Seems like a dumb move, given that the Ruby already had what most regarded as marginally functional valve events anyway.

Reply author: modlmkr

Replied on: 23 Mar 2006 16:49:12

I dont see how this makes any difference to running in reverse. You still have a single eccentric for each cylinder. Its position, relative to the crank throw is what controls the valve timing. The problem with a single eccentric is that it cannot have an optimum position in both forward and reverse.

With this mod you now have the ability to have different timing on each cylinder, so maybe one is set better for forward and the other is better for reverse. I'd expect this to make the running more 'lumpy' in both directions. It also makes timing more difficult because you have two adjustments.

In the original configuration I would have expected the two eccentrics to be accurately 90 degrees apart, just like the crank throw. That gaurantees identical timing on each cylinder. Could be the wrong timing, but at least both cylinders will be the same.

Now, if you made 2 eccentrics for each cylinder, and a true stephenson valve gear you could make an improvement. But that would be major surgery for a Ruby.

Reply author: Dave Hottmann
Replied on: 23 Mar 2006 18:29:21

Ron,

In a perfect world the single eccentric would work if the drivers are perfectly quartered and the eccentric discs are perfectly quartered to the mount. Unfortunately this only happens accidentally even with the best intensions, tooling and machinery. And if it does wear is the next problem. With the single eccentric in most cases the best you can tune the engine is to a perfect rectangle in the admission events, one side right on and the other side a little late. With dual eccentrics you can adjust the imperfections out so both sides of the engine work well together instead of one side burdenning the other down.

Reply author: Chris Scott
Replied on: 23 Mar 2006 19:29:17

Why would you not simply machine a second eccentric to add rather than cut one in half? Wouldn't that be preferable and provide a better result?

Or, simply order a second eccentric from Accucraft and install it?

Reply author: Dave Hottmann
Replied on: 24 Mar 2006 07:47:33

Making another or ordering another would take more time and money. On the Mogul making another is the best choice. Not enough matterial to split it. Besides on this Ruby I did it to see if it could be done. Next is a larger fuel tank. Kinda like starting all over again. Those who know me know I couldn't leave a new Ruby stock. I was worried the the new Ruby was a step backwards, BUT there is plenty of potential. After all they don't make '64 Impalas any more, time to move on.

Reply author: Brooks
Replied on: 24 Mar 2006 08:35:16

I'm not going to put a smiley face on this one, Dave. This is a step backwards for Accucraft and live steamers who enjoy their products. They got away with that bassackwards move to a single eccentric with the Mogul, and now it's spread to the Ruby. Fortunately, you have figured out a fix for both, and I thank you. We'd be a heck of a lot better off if you were taking Charlie's place, in my opinion.

I just can't get past the feeling that they are apeing Marx...who claimed that the only way capitalists could boost profit was to cut quality. That's balderdash, of course; the only way to boost profits is to increase market share with increased quality and decrease costs with productivity enhancements (computer controlled machining, for example). I like old cars as much as the next guy...but I would not want to make my commute and my job depend on them. :-)

Reply author: Charles
Replied on: 24 Mar 2006 08:48:27

Brooks

I agree, this is more about less and more cost (increase price of Ruby less quality) is not going to win over a customer based for the long term.

David statement is a good summary:

In a perfect world the single eccentric would work if....On the Mogul making another[eccentric] is the best choice.

Still on hold with the 4-4-0 production with hopes of best quality for the price quoted.

Reply author: Dave Hottmann
Replied on: 24 Mar 2006 12:36:05

Thinking back the first engines I bought with the single eccentric was on the Superiors. In this case there was a good reason for the single eccentric, it was thin enough that that the drivers could be re-gauged to 32mm. I left the eccentrics a lone for this reason and turned both of them into a Superior-Garratt. Too late to convert it to dual eccentrics, I sold it to Tom King. It likes Tom more than me.



At any rate the single eccentric was not enough to stop ME from getting a Ruby 2 and voiding the warrantee right out of the box. I still think the GOOD things Accucraft does out weigh the bad 🤔

Reply author: Dave Hottmann
Replied on: 25 Mar 2006 13:54:37

I just finished boring out a customer's Mogul. In this case the single eccentric matched the drivers so we decided dual eccentrics weren't necessary. Sometimes the single eccentric works.

Reply author: Dave Hottmann

Replied on: 25 Mar 2006 19:27:27

It basically comes down to 50-50. The eccentrics will work or not.

The problem comes in keeping machine tolerances to a minimum. I try to hold to $\pm .0005$ " but this is a $\pm .002$ " world because of money. Temperature changes in the machinery, tool deflection, and tool wear will bite you in the rear if you let your guard down. When I make a part and it's out of specs I keep it because the part it connects to might be off the opposite. These two parts will compliment each other and work as good as perfect parts. I don't like the idea of a single eccentric because it leaves no room for error. I might be one of Accucraft's fussiest customers but then again I keep buying them and void the warranty right out of the box. I wouldn't be in this hobby if it wasn't for Accucraft.

Tuning Air

Original Topic URL: http://www.mylargescale.com/forum/topic.asp?TOPIC_ID=15849

Topic author: Dave Hottmann

Posted on: 10 Jul 2003 18:55:25

I keep talking about low pressure air tuning. I have found this to be the best air supply. It is a 2 gallon hand pump weed sprayer with a rubber tipped blow gun. It supplies 12 psi down to less than 2 psi. I check the pressure by pushing an electronic tire gauge on the blow gun. Unfortunately the gauge won't register less than 2 psi.



Replies:

Reply author: Darryl Noble

Replied on: 10 Jul 2003 19:33:35

Say Dave, that is a nifty idea. I've seen the weed sprayers for under \$20 and I might give it try as I tinker around with my live steam engines but not nearly as much as you do. 🍀

I just can't wait to see what you might come up with next, so we may enjoy our hobby even more.

Darryl in Lost Wages "115 in the shade"

Reply author: Dave Hottmann
Replied on: 10 Jul 2003 21:58:20

Other advantages to this air tank are, it's quiet, portable, and runs on pizza!

Reply author: TimFlan
Replied on: 11 Jul 2003 09:36:00

Dave, how tough is it to connect the pump to the loco without leaking a lot of air?

Reply author: Towne Comee
Replied on: 11 Jul 2003 09:39:12

Or, an even better question, how do you connect the tank line to the engine?

Reply author: Dave Hottmann
Replied on: 11 Jul 2003 12:31:41

I hold the rubber tip against the boiler fill hole while pulling the trigger. I run the engine as SLOOOOOOW as possible and watch each admission event. Then I adjust whatever valve or eccentric that needs adjusting. Then run again. With the hose not screwed in it is easier to test, adjust, test, adjust.....#@***!#! God give patience NOW!

Reply author: daveb
Replied on: 11 Jul 2003 14:56:55

Dave, what about oil to the cylinders?

Dave Barker NHGRS

Reply author: Bob Starr
Replied on: 11 Jul 2003 15:04:54

Here is what I use to hook my air supply to my boilers. If you have changed to a goodall type valve in your boiler you have the old cap left over. I use my lathe and drill a hole thru the middle, but any old way to put a hole in it is fine. Soft solder a piece of 1/8 copper tubing in the hole and screw it in the boiler. Easy to pull the hose on and off and it will stay on with the low air pressure needed as long as you don't shut the throttle valve.

Reply author: Dave Hottmann
Replied on: 11 Jul 2003 17:46:58

Dave B.,

I don't worry about it. There is oil left over from the last run. If it's an unfired engine, the assembly lube will work. I try to air tune around one driver revolution per second.

Reply author: J.Christian

Replied on: 11 Jul 2003 18:46:45

Thanks for the tips on the air Dave.

I was wondering about how I was Going to Get the air that low.

All I have is an industrial air compressor and I have enough trouble getting the pressure low enough to paint.

Reply author: Dave Hottmann

Replied on: 11 Jul 2003 21:50:09

Chris,

My compressor has a regulator that is adjustable. I use to use it but the noise made it hard to concentrate and the pressure was inconsistant. Tuning with the regulator works but the weed sprayer is better. With the sprayer I was able to get my K-27 to run on 2.5 psi. I was also adjusting valves .001" at a time. My Ruby and Shay will run on less than 2 psi. If you can get your compressor 10 psi or less it will work.

Reply author: Dave Hottmann

Replied on: 25 Jul 2003 21:26:05

Here's another tip on air tuning. At NSS I air tuned the prototype 3 cylinder Shay by Accucraft. On this engine the admission events are every 60 degrees of crankshaft revolution. When fine tuning it my air tank supplied too much air. Then it dawned on me (BIG DUH) to turn the throttle down. With the throttle just cracked open and less than 2psi I was able to see each event and not have any overlap.

Reply author: rmarino

Replied on: 16 Aug 2003 06:56:02

Hello All:

While taking Dave's advice on tuning my Mimi after a Milton 9/16 Cylinder Upgrade, I discovered that my Badger air brush supply fitting screwed on to the pressure gauge fitting. Works great!

Rick Marino

Denver & Donkey Creek RR

Inside/Outside Admission?

Original Topic URL: http://www.mylargescale.com/forum/topic.asp?TOPIC_ID=16557

Topic author: Cougar Rock Rail

Posted on: 11 Aug 2003 13:03:48

Hi Everyone,

Back from holidays and I've missed lots as usual!

My question is, what is the difference between inside and outside admission on the Accucraft Shays?

The reason I ask is that I think it was Dwight that mentioned the Accucraft Shay could be changed from one way to the other, and that it performed better after the change. Although I'm still not "permitted" to open mine yet (only 2 more pounds to lose...6 for my wife!) seeing one run at the steamup we had at my place on the weekend got me hyped about things I can do to mine once I can play!

Although I'm familiar with my Roundhouse Billy valve gear since I made it from a kit, it's different in this case because I understand that it has something to do with turning the eccentrics around? Anyway, if someone can enlighten me enough to make the changes when the time comes, I'd greatly appreciate it!

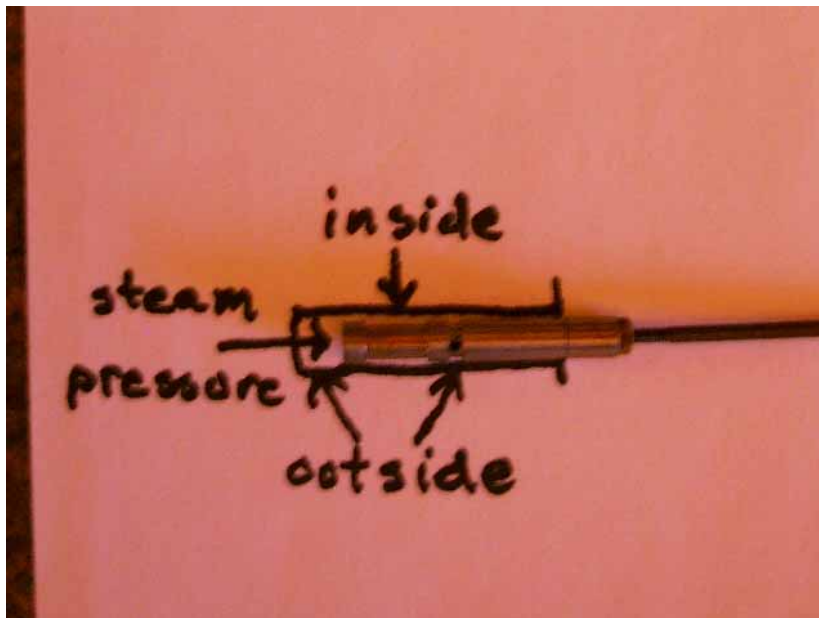
Keith

P.S. Those Shays sure are beautiful running locomotives...I can't wait!

Replies:

Reply author: Dave Hottmann

Replied on: 11 Aug 2003 20:21:24



Hopefully this poor picture is worth a thousand words. One thing you don't see is there is a hole in the center of the valve that connects the front to the rear groove. Rubys and Shays are outside admission in forward from Accucraft, and inside in reverse. With outside admission a steam pressure charge tries to push the valve out of the valve block. This loads the valve gear, causes extra friction and wears eccentrics. Steam can also condense at the end of the valve and hydraulically stop the valve. If you normally run your engine in forward you can rotate the eccentrics 180 degrees so it runs inside admission. Air tuning should also be done.

How's that Dwight?

Reply author: Cougar Rock Rail
Replied on: 11 Aug 2003 21:09:10

Ah ha!!! I didn't realize they were piston valves, that picture makes sense now, thanks a lot Dave! Why wouldn't Accucraft do it that way to begin with I wonder?

So I'm assuming to tune it you adjust the length of the eccentric rod? Can you give me a quick and dirty tuning lesson Dave? If it's like a slide valve engine, I can probably figure it out, but if you have to take the eccentric off each time to turn the rod that could be a pain.

I guess the other thing that has to be changed is pivot point on the forward/reverse lever. Otherwise it will be like an old manual Caterpillar bulldozer, where you pushed the opposite way you wanted to travel. That was OK until you were sliding down an embankment, in which case the least intuitive thing to do was push ANY lever forward! 🤔

Thanks Dave!

Keith

Reply author: Dwight Ennis
Replied on: 11 Aug 2003 22:01:30

Keith, you got it straight from the **ValveMeister!** I was just passing along what Dave told me. 😊

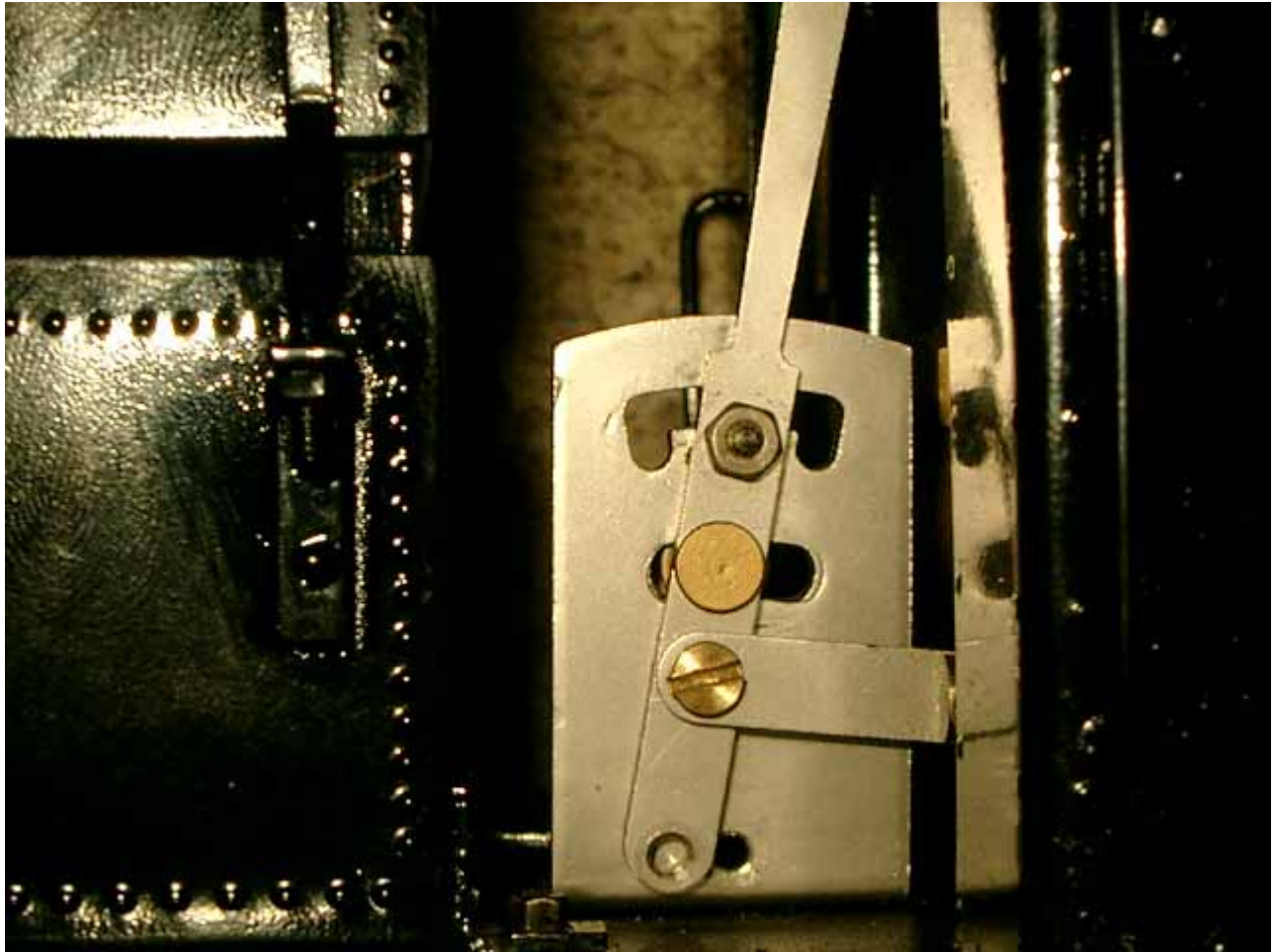
That's very good Dave. Of course you know we ALL now expect a clinic at next years Summer Steamup!! No weedling, whining, nor excuses will be accepted. 😊

Reply author: Dave Hottmann
Replied on: 11 Aug 2003 22:52:36

Keith,

Tuning is like a slide valve engine except you can't see the ports. The valve adjustment is external on Accucraft engines, except C-16s. Just loosen the locknut and turn the valve. I use low air pressure and maybe adjust the throttle to run the engine VERY slow (1rev/sec) so I can see the start of each admission event. Set the engine on blocks so the drivers are free. Check for any binds, this can give you a false late admission. Lates are pauses after dead center. Earlies stop at dead center. I try to get my admissions as close to dead center (but AFTER) as possible. This usually requires swear words. Perfection might be impossible because of small machining errors. Tune one cylinder at a time. If you have two lates, advance the eccentric. If you have two earlies, retard the eccentric. If you have one late and one early, adjust the valve. Keep the adjustments small and one at a time. I like to get the engine to run slow and smooth under 2psi.

Here's a reversed Johnson bar.



Reply author: Cougar Rock Rail
Replied on: 12 Aug 2003 09:10:52

Thanks Dave, that gives me something to think about, and I'll let everyone know what happens when I finally get it done.

Keith

Reply author: s-4
Replied on: 12 Aug 2003 11:43:15

So let me get this straight...

If i rotate the eccentrics 180 degrees, the johnson bar on my Ruby will have to be pulled back to make the engine go forward? This would be great since my Ruby runs beautifully in reverse yet rather weak in forward gear. Now i know why!!!

-jeff-

Reply author: SteveJ

Replied on: 13 Aug 2003 13:13:50

OK, call me slow, but I've studied that picture lots of times and I still don't get how the valve works. What am I missing here?

SteveJ

Reply author: TrotFox

Replied on: 13 Aug 2003 16:29:51

Dave,

Do you have any idea how many times I've tried to explain that to people and failed?! Your little drawing is the perfect setup for explanation!

Steve,

What part don't you understand? Do you know how a slide valve works? If so you can look at the photo and draw parallels to the operation of this valve. They work nearly the same except that this type can hold pressure either way (that's the inside/outside admission part.)

Trot, the mostly-confusing, fox...

Reply author: Dave Hottmann

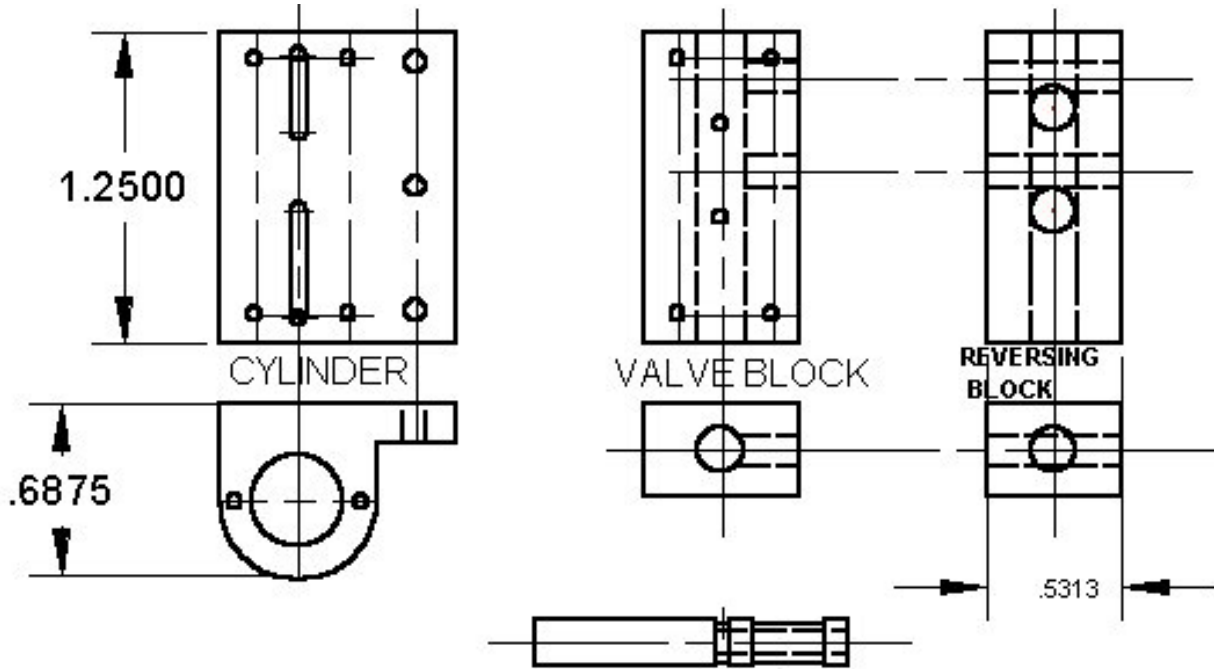
Replied on: 13 Aug 2003 18:40:25

Steve,

The picture doesn't show the ports (drilled holes) in the valve block. If I had an extra valve block I would cut it in half. The main point of the picture is to show where a steam charge can push the valve out of the block. Where the two arrows labeled "outside" are there is a drilled hole that connects the two. Hope this helps. Don't feel bad, I wore out seven sets of eccentrics before I figured it out. Now all my new engines with this valving get the eccentrics rotated before they get fired.

Reply author: Bob Starr
Replied on: 13 Aug 2003 21:29:53

I am not sure if this will help those that are having difficulty understanding, but here is a drawing that I did of the Ruby cylinder parts. These are measured drawings, but I doubt that they are in this format.



Reply author: Dave Hottmann
Replied on: 13 Aug 2003 23:40:58

COOL!!!

When I grow up I hope I can post something that nice.

Thanks Bob!

Reply author: SteveJ
Replied on: 14 Aug 2003 17:35:09

I think I've got now! Thanks for the explanation/pictures. Now all I need is the cash for a locomotive to play with.

SteveJ

Well I thought I had it all worked out, but while I was washing up I realized that I don't get the purpose of the reversing block. I thought reversing was done by adjusting the valve gear. Hope I'm not annoying anyone with questions.

SteveJ

Reply author: Dave Hottmann
Replied on: 14 Aug 2003 21:12:54

Steve,

Now I understand your confusion. And you're not annoying anyone. On Rubys and Shays the changing direct is done by the reversing block. The valve gear doesn't change. (Although C-16s and K-27s change the valve gear to change direction.) The reversing block reverses the steam/exhaust flow which reverses the steam/exhaust flow in the piston valves. Out of the box Rubys and Shays admit thru the outside and exhaust thru the inside in forward. The reversing block has the same piston valve in it and is outside admission in forward out of the box. Since these engines run better in reverse, I make reverse forward so it runs better forwards.

Reply author: Slick
Replied on: 17 Aug 2003 07:16:27

Hello all, I've made the reversing of the eccentrics fix on my "Ruby-Mimi" as suggested by Dave Hottmann and I must report that it was well worth the effort. The engine now operates at less than supersonic speeds, the steam valve will actually control it's driving and pulling power, my teeth are whiter and my sheets are brighter... (huh?). No kidding though. After entering a realm of shear doubt, how will I get this back together... lots of cussing and then yikes, it works! I think this might be a great first lesson in taking the mystery out of steam operation and add to it's mastery... I suggest to the owners of digital cameras to document the progress of their work, this will give quick reference to how it all goes back together.

Reply author: Robert 50
Replied on: 24 Aug 2003 12:41:53

Being new to the hobby I would also love to see a few pictures of this procedure before tackling this on my new Shay.

Reply author: Dave Hottmann
Replied on: 24 Aug 2003 20:03:19
Message:

Robert,

It would almost take a video tape to show each step. The easy part is rotating the eccentrics. I have found it easiest to hold the eccentric and rotate the crankshaft to help me eyeball 180 degrees. The next step is air tuning, this takes patience. As far as reversing the Johnson bar, this doesn't have to be done if you don't mind it being backwards. If you need help send me an e-mail.

As a side note, I just worked on a prototype C-21. It was built inside admission, YEAH! Made a couple of runs. Nice engine. I want one now.

Reply author: SteveJ
Replied on: 24 Aug 2003 21:08:37

Dave,
I've been away for 10 days (best part was seeing a real Shay operate!)so haven't been able to reply. NOW it makes sense. Didn't help that I was looking at the Roundhouse Technical section as I was trying to figure it out! Thanks.

Reply author: Robert 50

Replied on: 25 Aug 2003 17:21:56

Dave,

Thanx for the reply. It should be fairly easy except for the air tuning. Johnson bar will be the easy part. I plan on RC in the distant future. I've found some websites that give pretty good info but I will probably talk to someone local that can show me a little before I take the leap. I'll email you if it gets "too" interesting for me !

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