



# BALTIMORE AMERICAN FLYER CLUB

## American Flyer Switch Modifications

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### WHAT CAN YOU DO WITH THE A. C. GILBERT'S AMERICAN FLYER TRACK AND SWITCH

Today when it comes to selecting a track and switch manufacture and standard for your layout, the debate on which system is best often comes down to a list of pros/cons of each system. The big question is: Which system is best? Often the A. C. Gilbert American Flyer System is not listed high on most people's final list.

For us American Flyer operators, when it comes to A. C. Gilbert's American Flyer track and switches, we believe there is nothing that you cannot do with this track and switch system. We will illustrate with photos and step-by-step how-to-do almost anything that you could imagine with regards to track and switch for your layouts.

The American Flyer track and switch system is the least expensive system to buy. Therefore if you can modify the track and switch system to give you unlimited track design flexibility at a very low cost, what could be better?

We will be illustrating the following different AF switch and track modifications:

- Reduce the centerline offset from a 5-1/8" centerline to 2-1/2" centerline
- Eliminate the dreaded back-to-back S-Curve for a switch crossover
- Change from a twin coil motor to a Tortoise switch motor operation for an AF switch
- Compact Toggle Switch Control Boxes
- Flip the detent operations to provide a compact yard ladder design
- Modify the AF switch base to provide a very compact switch design and operation
- How "not" to clean the dirtiest, ugliest, rustiest, "paint-est" AF track
- Flipping the AF Uncoupler under the layout for Yard Control
- How to install the new modified AF uncoupler?

### REDUCE THE CENTERLINE OFFSET FROM A 5-1/8" TO 2-1/2"

The easiest project with very little skills required is to modify the AF switch to reduce the centerline offset from 5-1/8" to 2-1/2". The term offset is the measure of two parallel tracks. If you were to measure the two tracks under normal geometry, the offset would measure 5-1/8". The consequences of this wide of an offset means that in a 36" wide yard configuration you would be limited to only a seven (7) ladder yard. If you divide 36" by 5-1/8" you would have seven parallel ladder track yard. However, if you were able to reduce the offset distance to 2-1/2", then you can increase the number of ladders to fourteen (14) ladder yard in the same space.

Now we are talking some yard operations in the same 36" width table. In addition to an expanded yard ladder, the closer track spacing is more realistic. There is nothing more exciting to back a string of box cars down a narrow vacant ladder track "deep" within your operating yard. Please refer to **Photo 1** for an example of an operating yard ladder.

Please refer to **Photo 2** and **Photo 3** to illustrate the difference of a normal 5-1/8" offset and a modified AF switch to 2-1/2" offset. Please note the AF modifications to gain the tighter yard ladder spacing. In **Photo 2**, Switch #19 illustrates the standard AF offset of 5-1/8". In **Photo 3**, Switch #20 has been modified to an offset of 2-1/2". This modification is described below.

#### **Modification to AF Switch to a 2-1/2" offset with no modifications to the twin coil operations**

This is the easiest modification that you can learn to do to an AF switch is as follows. The twin coil control remains the same and therefore the traditional four wire controller is the same.

- Step 1: Using a Dremel cut off wheel, cut the outside curve section of the track parallel to exit point beyond the black plastic triangle.
- Step 2: Remove the curve sections of the switch. The track will slide easily out from the brass tab clips.
- Step 3: From a curve AF track section, remove the first metal tie.
- Step 4: Slide the second metal tie inboard just enough to clear the AF switch base.
- Step 5: Trim the bottom flange on the "inside" curve section of the curve track. This is required to avoid the flange of the "inside" straight section of track from touching and causing a short circuit.
- Step 6: Slide a metal track pin into the end of the curve track and mate the track to reverse the curve.
- Step 7: To ensure improved electrical conductivity, use a Dremel wire wheel and clean the outside flange web and solder the "outside" curve section of track with a 3/4" piece of copper bare wire.

- Step 8: Using a Dremel wire wheel, clean all brass track tabs and track flanges and solder the track flanges and brass tabs for better electrical conductivity. Soldering the brass tabs also secures the track in place.
- Step 9: Using a Dremel cut off wheel, cut the full length curve track at the point where the track is parallel to the base straight track. This cut point is between the second and third metal tie. We have found that you can find this cut point by eye. As long as you are fairly close, you will enjoy reliable operations.
- Review: It is important to note you have **NOT** changed the radius of the track. You have reduced the degree of arc of the curve. Therefore, your engines including your Northern #336 will be able to back into the ladder without any problems or derailments. That is a beautiful thing to watch.

### **Modification to AF Switch to a 2-1/2" offset with modifications to change the twin coil to either manual or Tortoises operations**

This modification uses the same principles of design as above but in this approach we will save more space by removing the bulky AF twin coil switch motor. We will describe both options in this modification. There is an advantage to either approach. If you plan to manually move your switches, then using the AF detent spring and lock system will remain intact. If you plan to use a Tortoise switch motor, then the AF detent spring and lock system will be removed. With either option, you will see how much space is saved. The advantage of removing the bulky AF switch motor comes into play by removing the obstacles that hit the engine's overhang. As we learn how to make the AF switches more compact, engine overhang becomes a huge problem. Any modification that removes the AF twin coil motor and motor "tombstone" or tower will enhance railroading operations and appearance.

Please see **Photo 4** and **Photo 5** for an example of each style. **Photo 4** illustrates the 2-1/2" offset with the switch motor tombstone removed. **Photo 5** illustrates the standard 5-1/8" offset with the switch motor tombstone removed. The modifications for the above are as follows:

- Step 1: Turn the AF switch over and unscrew the metal plates on the underside of the switch.
- Step 2: Remove the motor top cover and screws
- Step 3: Remove the twin coil motor and save as spare parts for "normal" AF switches
- Step 4: Turn the switch upside down and remove the all the moving parts: detent, spring, contact slide and detent cover.
- Step 5: Using a Dremel cut off wheel or sabre saw, cut the AF base as illustrated in **Photo 6**
- Step 6: Please refer to **Photo 7** where to bend and "break" the contact slide as shown in the photo.

- Step 7: If you plan to use the AF switch in a manual mode, you would need to “flip” the detent cover plate and drill two additional holes and screw the detent cover plate is as shown in **Photo 8**.
- Step 8: Some of the earlier AF switches had a small piece of plastic to help guide the contact slide in a straight slide motion. If your switch does not have the plastic guide, then we have cut a small piece of wood and we have glued it in place using super glue.
- Step 9: Re-screw the small metal cover plate. The contact slide and cover plate will be trimmed at a later step.
- Step 10: Follow the same Steps 1-9 from above to modify the track to reduce the offset centerline to 2-1/2”.
- Step 11: Slide the AF frog to the straight position and trim the contact slide and cover plate to give you an “even” finished look. If you want, you could cover the open exposed edge of the AF switch with a small strip of card stock glued and blacken using a marker pen.

#### **ELIMINATE THE DREADED BACK-TO-BACK S-CURVE FOR A SWITCH CROSSOVER**

The “enemy” to smooth operation on any operating layout is the dreaded S-Curve. With a little design thought, you can eliminate the S-Curve forever. We will be illustrating how to eliminate the S-Curve on an AF switch crossover, but the same technique can be applied to regular AF curved track. The finished results places a straight section of track between the two reduced arc of curve of the crossover AF switches.

Please refer to **Photo 9**; Switch #14A illustrates the straight section of track place between the two switches as an example of this modification. This switch also is driven by an under the layout Tortoise switch machine.

- Step 1: Draw the two centerlines of your final track plan location.
- Step 2: Place each switch over the centerlines and temporary screw the switches in place.
- Step 3: Measure the distance between the two switches from just beyond the black plastic triangle to the same location for the other switch.
- Step 4: Using a Dremel cut off wheel, cut two pieces of straight track. These two pieces of track will be long enough to “bridge” the distance from each AF switch.
- Step 5: Trial fit the straight track by lifting up one of the switches, insert the “new” straight track and re-fit the switch to verify everything fits as you had planned.
- Step 6: If everything is correct, then cut the crossover straight track in half and insert a fiber/insulating pins on each rail. This is required if each loop has a separate power supply and if not; it is generally a good practice to isolate the crossover track.

## CHANGE FROM A TWIN COIL MOTOR TO A TORTOISE SWITCH MOTOR OPERATION

As we learn to become more “free” with the Dremel cut off wheel, the twin coil motor is usually the first item to be eliminated. If the modified switch is going to be remote controlled, then an under layout stall motor is an easy method to use. We have used the Tortoise switch motor. For AF operations, we have made a number of minor but important modifications to the Tortoise switch motor. Please refer to **Photo 10**. Switch #11 has been shown earlier but this photo illustrates how the Tortoise machine is used to control the switch.

Those modifications are as follows:

- Step 1: In order to get enough leverage and throw for AF switches, there needs to be 1.0” spacer below the base of the AF switch and the base of the Tortoise machine. Please refer to **Photos 11**. This photo also illustrates the additional modifications needed to the switch machine.
- Step 2: Slide the adjustable slide to the max leverage
- Step 3: Due to concerns that we have place too much leverage on the plastic slide, we cut aluminum angle to provide a better service factor.
- Step 4: Silicone “glue” the slide in place to prevent the slide from moving
- Step 5: In order to be able to apply the greater leverage, we up sized the spring wire.
- Step 6: The low amperage DPDT aux contacts on the Tortoise switch machine have proven to be “fun”. We have hooked up MTH’s semaphore which is directly activated when the latching toggle switch is made. There is nothing nicer to see than a remote switch’s position being illuminated with a green or red semaphore signal.

## COMPACT TOGGLE SWITCH CONTROL BOXES

As often the case, there are unintended consequences to learning how to modify AF switches. The AF switch modifications have increased the number of switches on the layout. All of our switches are remote controlled. Therefore, we need more switch controllers. If we use the standard AF switch controller, we would quickly run out of control panel real estate. We have overcome this problem by using mini ¼” toggle switches. In fact, you can use either, DPDT Mon-Off-Mon or DPDT On-On latching switches.

If you look closely at **Photo 12 & Photo 13**, you will be able to see that toggle switches 8, 9, 10, 11, 13A & 14A are DPDT On-On latching switches which we use to control Tortoise switch machines. The other toggle switches which are DPDT Mon-Off-Mon are for the tradition AF

switch's twin coil motors. The "good thing" about this approach is it allows you to pre-wire your control boxes with both styles of toggle switches. The pre-wired pigtails then can be wired to a terminal strip in a clean and neat fashion. The green and red dots are ¼" press on dots and can be purchased from an office supply store.

### **FLIP THE DETENT OPERATIONS TO PROVIDE A COMPACT YARD LADDER**

"Flipping" or moving the detent slide control operations of the AF switch from the "inside" to the "outside" of the AF switch base offers many wonderful operations benefits. By flipping the detent system to the opposite side of the AF switch, you can achieve a more realistic yard design. As soon as you view this approach to modifying the AF switch, you will realize anything can be done to an AF switch. You can design your operating layout as you would like. Your railroad's functions control your design. You are not inhibited by the traditional AF switch operation or design.

Please refer to **Photo 14** for an overview of this approach. It is exciting to be able to understand that your imagination is your only "design" limitation.

- Step 1: DO NOT use the later production switches that have the thermo plastic bases. They do not cut worth a darn and won't epoxy as well. If you take too long on a solder joint, they also will melt from soldering heat. They can be identified by the slightly softer and somewhat flexible feel. There are provisions for two clips on both the long curved turnout rail and the long straight rail.
- Step 2: We make a point of fully disassembling (Except not the movable points!!!!) each switch and do a thorough cleaning with Simple Green, hot water, and a scrub brush. After cleaning the AF switch, we follow up with a complete inspection of the switch. On the electrical contacts, Simple Green and a brass brush do wonders removing the tarnish and cleaning of the AF switches. We also use the brass brush and Simple Green on the sides of the rails, especially where we intended to solder the brass clips to the rails. We also use Scotchbrite on the tops of the rails and the points. You will probably still need to use a soft Dremel wire brush to remove the oxidation where you want to solder the brass clips and rails together. However, you want to use a very light touch. If you take off the copper plating on the brass clips or the zinc plating on the rails you will expose bare steel and it doesn't like to be soldered when using rosin core solder. In addition to using rosin core solder, we got some water soluble flux @ Home Depot. Use it to solder the brass clips and rails together. Rewashing the AF switch in hot water and a scrub brush removes all traces of the flux.
- Step 3: We clean, straighten out old attempts to increase spring tension and re-bend the slide bar contacts to the original profile so that when reassembled they have good spring tension and the contact sections ride flat on the base contact pads. You want area contact, not point contact. We also make sure to clean around the point screw hole as this is the electrical contact for power to the points. When reassembling, to remove all dirt and oxidation, we also wire brush the shoulder screw where it will make contact with the detent slide bar.

- Step 4: The main line switch can be a regular switch but to fit in our trailer slots we are using one with the tower removed. Please see **Photo 15**.
- Step 5: The second switch from the main line, first ladder switch needs to have the straight section cut short but does not need to have the detent moved as long as you trim the one corner of the AF switch to clear the main line roadbed.
- Step 6: For all of the ladder switches, we cut the straight section 7-3/8" from the point end of the switch. Please refer to **Photo 16 & Photo 17**.
- Step 7: If you are only cutting down the switch and not relocating the detent, **DO NOT** cut the detent housing off, as shown in the photos. Please refer to **Photo 18**. They are only for the yard ladder switches. Leave the detent housing and cut off the tower so the cuts are flush with the inside of the tower. This will give a smooth profile to the finished switch.
- Step 8: When moving the detent to the other side for the ladder, there are some finer points to keep in mind. They are as follows:
- Step 9: First, when cutting off the tower leave enough on the detent housing to form the two tabs to epoxy it to the base on the other side. These will have to be cut and filed by trial and error to get a good fit. You want the finished edge that was the inside surface of the tower to align with the edge of the base. The bottom of the detent housing needs to be flat and flush with the body of the switch. We used a plastic shopping bag over a hard flat surface to hold everything in proper alignment while the epoxy set. We epoxied in a scrap piece from the tower to fill in the gap for a more finished look. It acts like a glue block for more strength. Rough up the surfaces and do a good solvent alcohol cleaning before bonding.
- Step 10: Second, you need to notch the side of the base to clear the reversed slide bar. Please refer to **Photo 19, Photo 20 & Photo 21**.
- Step 11: Third, since the contact wiper on the slide bar is not symmetric with the screw hole you need to shorten one of the "V" legs. The "V" legs on each side need to be moved back onto the contact pads on the base. We did this with small needle nose pliers bending the "V" offset into one leg. Be careful, too sharp a bend and you can break the contact's leg. Please refer to **Photo 22**.
- Step 12: Fourth, **Photo 23** shows 4 screw holes in the detent covers. Some of the switches have different hole patterns so we just gang drilled the extra two (2) holes. We do this so we wouldn't have to stop and drill the holes as we are reassembling the modified AF switch. Generally the switches that have the relocated detents do not need the alternate holes.
- Step 13: Fifth, you will have to adjust the detent piece on the slide bar so you get equal detent on both sides.
- Step 14: For switches that do not have the molded in boss that prevents the slide bar from being pushed sideways by the detent spring and does not have the "Finger" detent cover, there are two (2) approaches to correct the issue. One is to use a piece of sheet metal and make a combination detent cover/slide bar retainer. Please refer to **Photo 24**. Two is to glue in a wood block and depend on the regular AF metal bottom cover plate to hold the slide bar up far enough for positive engagement of the detent pin. Both approaches work very well.

## MODIFY THE AF SWITCH BASE TO PROVIDE A VERY COMPACT SWITCH OPERATION

As you get comfortable with the use of a Dremel cut off wheel and the mechanics of the AF switch, your imagination will begin to look at switching and track problem in a completely different manor. Please refer to the following **Photos 25 to 30** to gain some visional insight into the many different possibilities.

- Photo 25:** Switch #8 is a standard AF switch. Switches #9 & #10 are highly modified. Both #9 & #10 are Tortoise switch machine controlled.
- Photo 26:** This is a close up of Switch #9 & #10. In Switch #9, the control arm from the Tortoise switch machine comes through the AF frog screw hole. The Tortoise control arm for #10 is moving the AF detent contact slide arm. Both approaches work very well.
- Photo 27:** AF Switch #11 offers some pros & cons for operational use. The AF switch is an older style. The electrical route switching is achieved by moving the frog across two brass “buttons”. This switch is easy to modify but one can have trouble with the quality of the track and the electrical routing system. Switch #13A illustrates using a straight section of track and how compact we can make a crossover when you eliminate the switch tombstone/tower.
- Photo 28:** Switch #15 is a standard AF switch. Switch #16 illustrates using the standard AF offset with a Tortoise switch machine. Switch #17 has been modified to have a 2-1/2” offset and a Tortoise switch machine.
- Photo 29:** Switch #18 illustrates that the straight section was cut short and the Flyer curve was started about 2” sooner. The offset remained standard but the switch is driven by a Tortoise switch machine.
- Photo 30:** Switch #21 illustrates a standard AF switch with the straight section shorten. The mainline is to the curve. The straight leads to a siding. We wanted the siding to be parallel and as close as possibly to the main line. This simple modification made the track work possible.

As you look and view the photos of the AF switches being cut and modified, the only limiting factor to consider is the length of the movable frog. Once you have set yourself “free”, you can cut the straight “exit” track section anywhere after the frog and anywhere before the “entrance” to the frog, the possibilities are unlimited. The same goes for the “exit” point of the curve section of track. As for the AF base, there is no reason you cannot custom cut the base to fit your operational needs.

As a practical matter, we tend to cut and modify manual AF switches before cutting up a perfectly good operating automatic #720 switch. Before cutting up a good #720 switch, we would sell it at

market price and then use the proceeds to purchase many more of the manual less desirable AF switches. We have found that the manual switches can be purchased for almost next to nothing and they also tend to be damaged from years of abuse. The “damaged” AF switch is the perfect candidate for all of our AF switch modifications.

### HOW “NOT” TO CLEAN THE DIRTIEST, UGLIEST, RUSTIEST, “PAINT-EST” AF TRACK

As you begin to look at the AF track and switch system to solve your hi-rail needs, you will begin to look at the possibilities of reusing the old and aged AF track. Because of we have adopted a restoration process that is successful on any AF track, we have begun to look and seek the dirtiest, ugliest, rustiest, “paint-est” AF track around. When you are willing to take the worst of the worst, you obtain AF track for the lowest possible cost. In some cases, the lowest possible price is FREE.

The trick to making the “xxx-est” track beautiful and functional is as follows:

- Step 1: On a piece of paper or cardboard box, layout each piece of track to be spray painted. Please refer to **Photo 31**.
- Step 2: We have purchased the least expensive flat black spray cans of paint from Home Depot for \$0.99/can. If you prefer a flat rust color on your rails, then the brown primer color would look very nice also. We are a flat black group. The flat black color matches up nicely with the AF rubber road bed or the wood ties with rubber ballast. In either situation, the track looks great and performs superb.
- Step 3: It is our suggestion that you make four passes for each piece of track. This approach will paint everything one uniformed flat black color. Your paint will cover up all the dirt, ugly, rust and “green” paint from scenery that has spilled over onto the track ties. Please refer to **Photo 32**.
- Step 4: Once the paint has dried, the rail head needs to be cleaned. We have performed this task by using the wire wheel on a 6” bench grinder. We take each piece of track and make two passes on the wire wheel: one pass for each rail. In due time, you will become very efficient in the entire process. If you have some heavy rust, generally a second pass on the wire wheel makes short order of the task. When completed, the track looks great and will perform as if it was brand new track. The uniformed flat black look gives the track a realistic look and all the “ugly” has disappeared.
- Step 5: The final step is to inspect each piece of track for being in good shape. If any track is twisted or missing metal ties, then “harvest” the track pins toss the track out or set them aside for any custom cut shorten pieces of track in the future.

## FLIPPING THE AF UNCOUPLER UNDER THE LAYOUT FOR YARD CONTROL

When the standard AF switches are used, the centerline distance is 5-1/8". With a 5-1/8" centerline, the standard AF uncoupler will fit between the tracks. In order to fit more tracks in our freight yard in the same amount of space, we modified our AF switches to have track centerline reduced to 2-1/2". This modification increased our yard from six (6) to eleven (11) track ladders. The success in adding tracks to our yard create another problem. The new problem was "How are we going to un-couple our box cars in the freight yard?"

Our first plan was to build an L-shaped tool that would allow us to reach between the box cars and uncouple them. The system worked; however, the system was manual. Being a control freak, we decided to modify an AF uncoupler to be used with our new freight yard. We wanted to have a remote controlled automate operating uncoupler system.

The AF uncoupler is a very simple device. It works on two principles. One is the electromagnetic coil and the other is that of a seesaw. When the coil is energized, the metal seesaw is pulled down on one end and the uncoupler bar is lifted up on the other end. As we know, when the bar is lifted up, the knuckle coupler on the freight car is opened.

To modify the uncoupler, the coil needs to be removed and turned upside-down. This allows the uncoupler to fit between the reduced tracks centerlines. In order to fit the modified uncoupler between the tracks, we will need to cut a hole in the table. We will describe the hole pattern later in the text.

### How to Modify the American Flyer 706 Remote Uncoupler

For this project, when we measure, all dimensions are measured from the side of the uncoupler with the track clamp. Let's go step-by-step on "How to modify the American Flyer uncoupler".

- Step 1: Drill out the four corner rivets which hold the uncoupler together.
- Step 2: Separate all the parts.
- Step 3: With the coil to the right and the track clamp to the left, measure 2-3/8" from the clamp side and cut the top piece at this mark. Please refer to Figure 1.
- Step 4: With the coil to the right and the clamp to the left, measure 2-11/16" from the clamp side and cut the bottom piece at this mark. Please refer to **Figure 1**. The piece which you have cut will be referred to as the "coil piece".
- Step 5: From the clamp side of the bottom piece, measure 2-1/4" along **both long sides and make a mark 1/8" from each side**. At this mark, drill a 1/8" hole. Please refer to **Figure 1**.
- Step 6: With a hammer, flatten the two stamped metal corners on the coil piece.

- Step 7: Using tin snips, cut on an angle an opening in the front of the coil piece. This will allow the metal seesaw to rest in front of the upside-down coil. Please refer to **Figure 2**.
- Step 8: Next with pop rivets, re-secure the top and bottom pieces of the modified uncoupler from the clamp side of the uncoupler with the uncoupler bar in place **using the original holes**.
- Step 9: Line up the holes in the coil piece with the two new holes which you drill in step 5 and drill a 1/8" hole through the top, bottom, and coil pieces.
- Step 10: Place the seesaw upside-down under the uncoupler bar.
- Step 11: Leave a 3/16" spacer between the top and bottom piece and the upside-down coil and pop rivet all the pieces together using the "new" 1/8" holes that you made in step 9.
- Step 12: The modified American Flyer uncoupler is complete.

#### HOW TO INSTALL THE NEW MODIFIED AMERICAN FLYER UNCOUPLER?

- Step 1: To install the new uncoupler on your layout, you will be required to cut a square hole for the modified American Flyer upside-down coil to fit into. Measure from the track centerline on your layout 1-1/4" and 2-3/8" and make a 1-1/8" square hole between these two marks. Please refer to **Figure 3** for a final view.
- Step 2: Sometimes you will have to slide the metal AF ties in order to get the new uncoupler to fit under the adjacent track
- Step 3: Run the wires under the layout to your push button control panel.

#### OPTIONAL MODIFICATION

- Step 1: With some of the new American Model boxcars, the uncoupler shoes do not operate properly with the AF uncoupler. This can be corrected by inserting a small piece of wood strip in between the uncoupler bar. Paint the wood strip black or brown/black and you will have a good looking uncoupler that works.

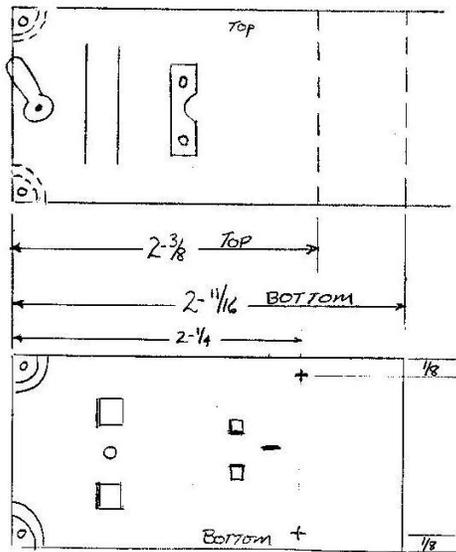


Figure 1

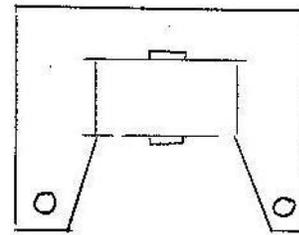


Figure 2

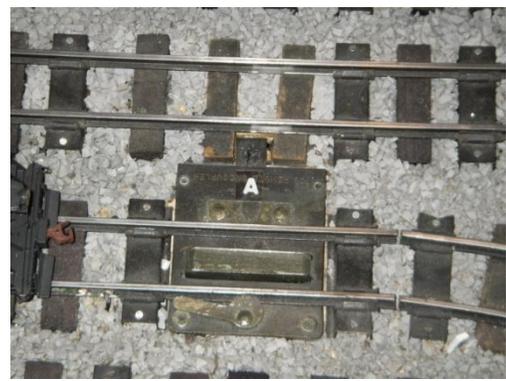


Figure 3

### IN SUMMARY

After you have mastered the above American Flyer switch's modifications, you will be able to dream your dreams of a great railroading empire.

By being able to make the modifications to the AF switch, there is nothing that cannot be accomplished from a track and switch design layout point of view.

So get out your Dremel cut off wheel and have a go at it.

Your railroading empire dream awaits you.



Photo 1 - Operating Yard Ladder



Photo 2 - Switch #19 is has a standard AF 5-1/8" spacing.  
Switch #20 has been modified to the 2-1/2" spacing.

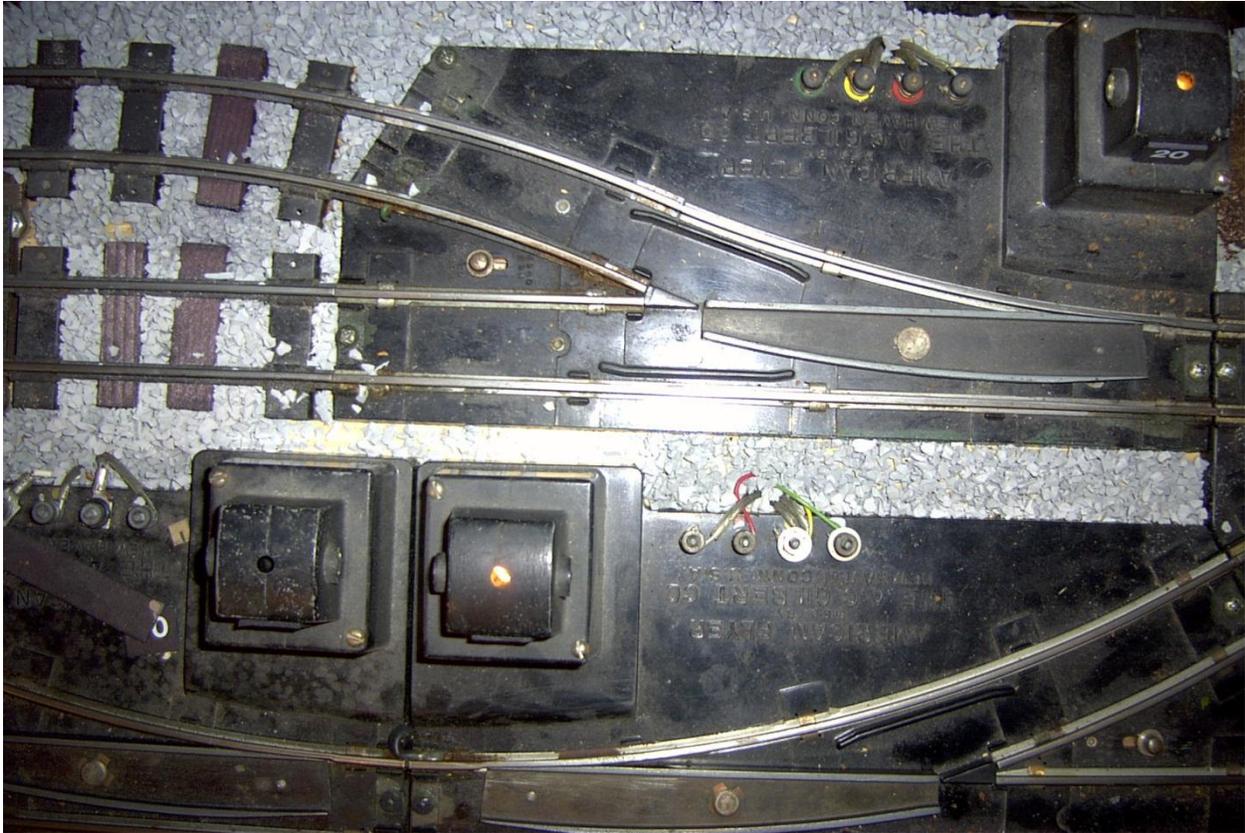


Photo 3 - The top switch #20 is a close up image of the modified to 2-1/2" spacing.



Photo 4 - Illustrates the 2-1/2" offset spacing with the switch motor tombstone removed.



Photo 5 - Illustrates the standard 5-1/8" offset with the switch motor tombstone removed.



Photo 6 - Illustrates the cut line to remove the switch motor tombstone.



Photo 7 - The two outside images illustrate the slide bar before modification.  
The center image shows the “break” line.



Photo 8 - The left image “flips” the detent cover with new screws holds.  
The right image shows the detent and slide bar with the “finish” look.

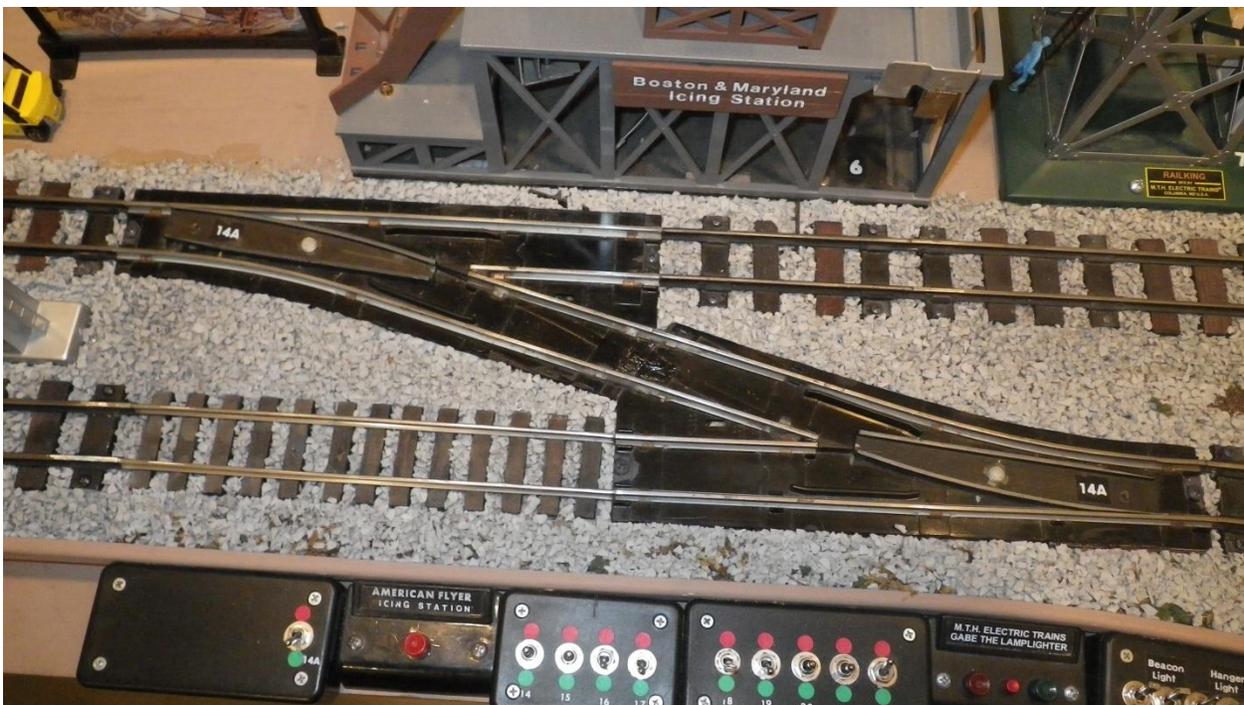


Photo 9 - Switch #14A has a straight section of track.

The straight track eliminates the dreaded S-curve.



Photo 10 - Switch #11 illustrates the removal of the tombstone and the under deck location of the Tortoise switch machine.



Photo 11 - In order to obtain enough leverage and force, the spring wire has been up sized and the adjustable slide bar has been caulk in place.

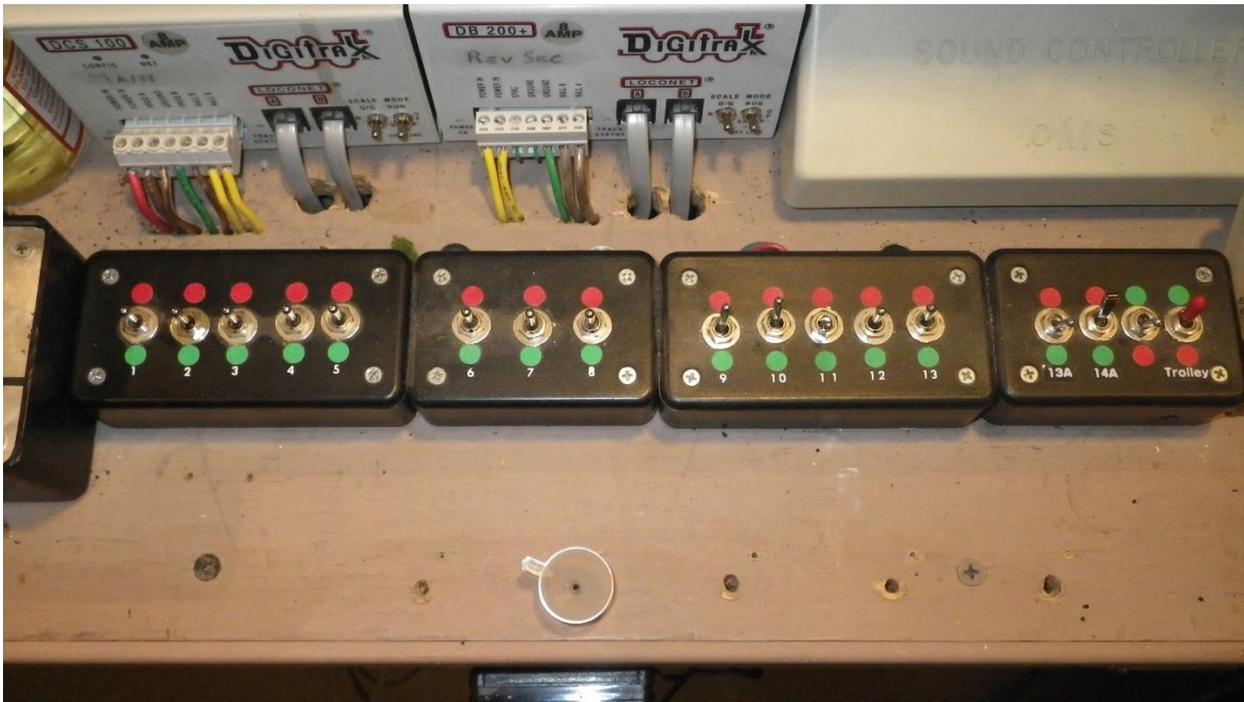


Photo 12 - In order to save control table space, ready boxes can be custom made to save space.



Photo 13 - Switches #9, 10 & 11 are used to control Tortoise switch machines and Switches #12 & 13 control standard AF twin coil switch motors.



Photo 14 - Flipping the Detent Operations will provide a compact yard ladder.



Photo 15 - Normal location of the detent is on the inside of the curve section of the switch. By “Flipping” the detent to slide to the outside of the switch, you can compress the yard ladder.



Photo 16 - Another key is a compact yard ladder is to cut the straight section to 7-3/8”.



Photo 17 - The above image illustrates the cut off pattern.



Photo 18 - In order to compress the yard ladder, the above image illustrates additional modifications required.

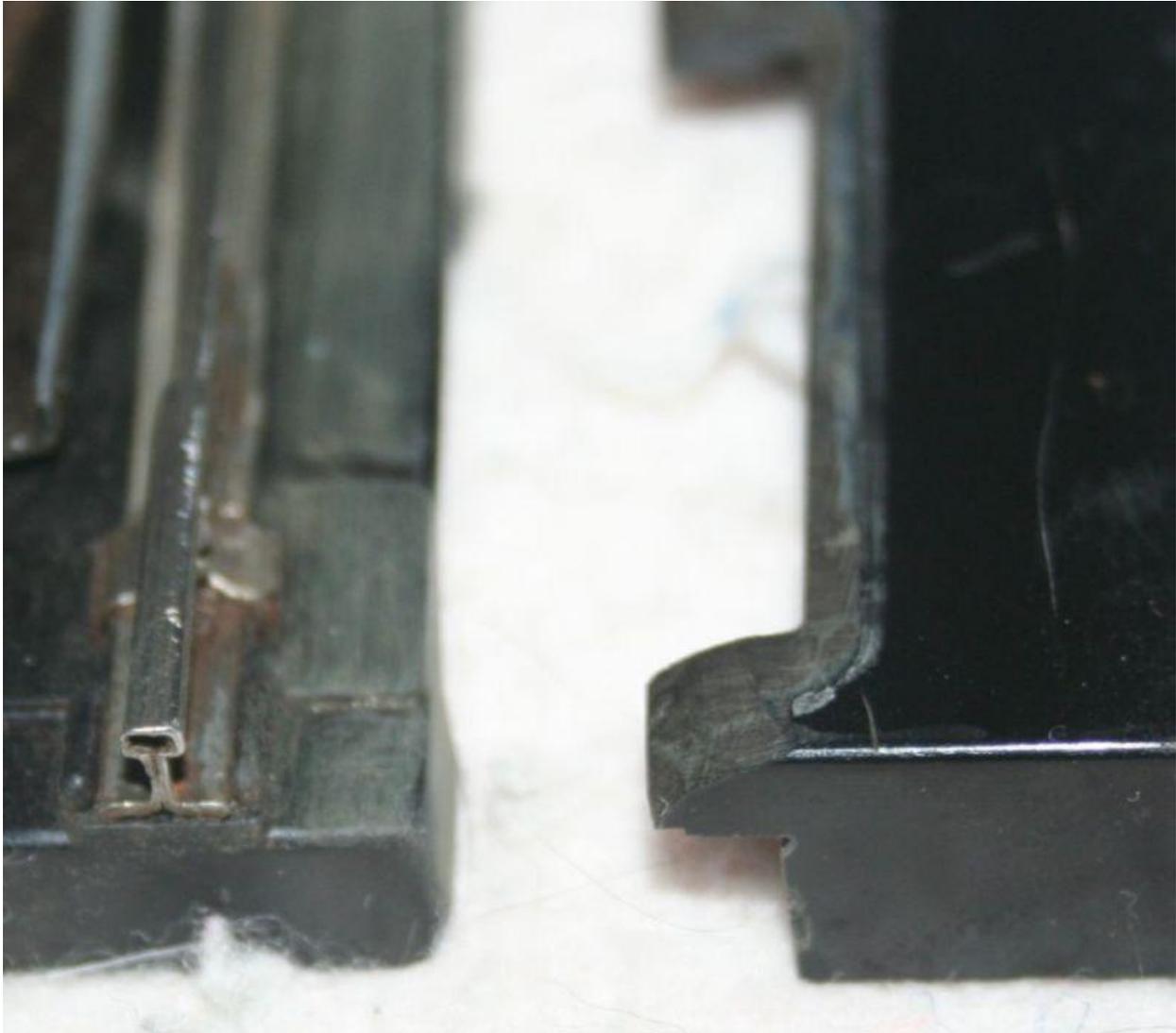


Photo 19 - In order to improve the bonding surfaces, the base needs to be notched.

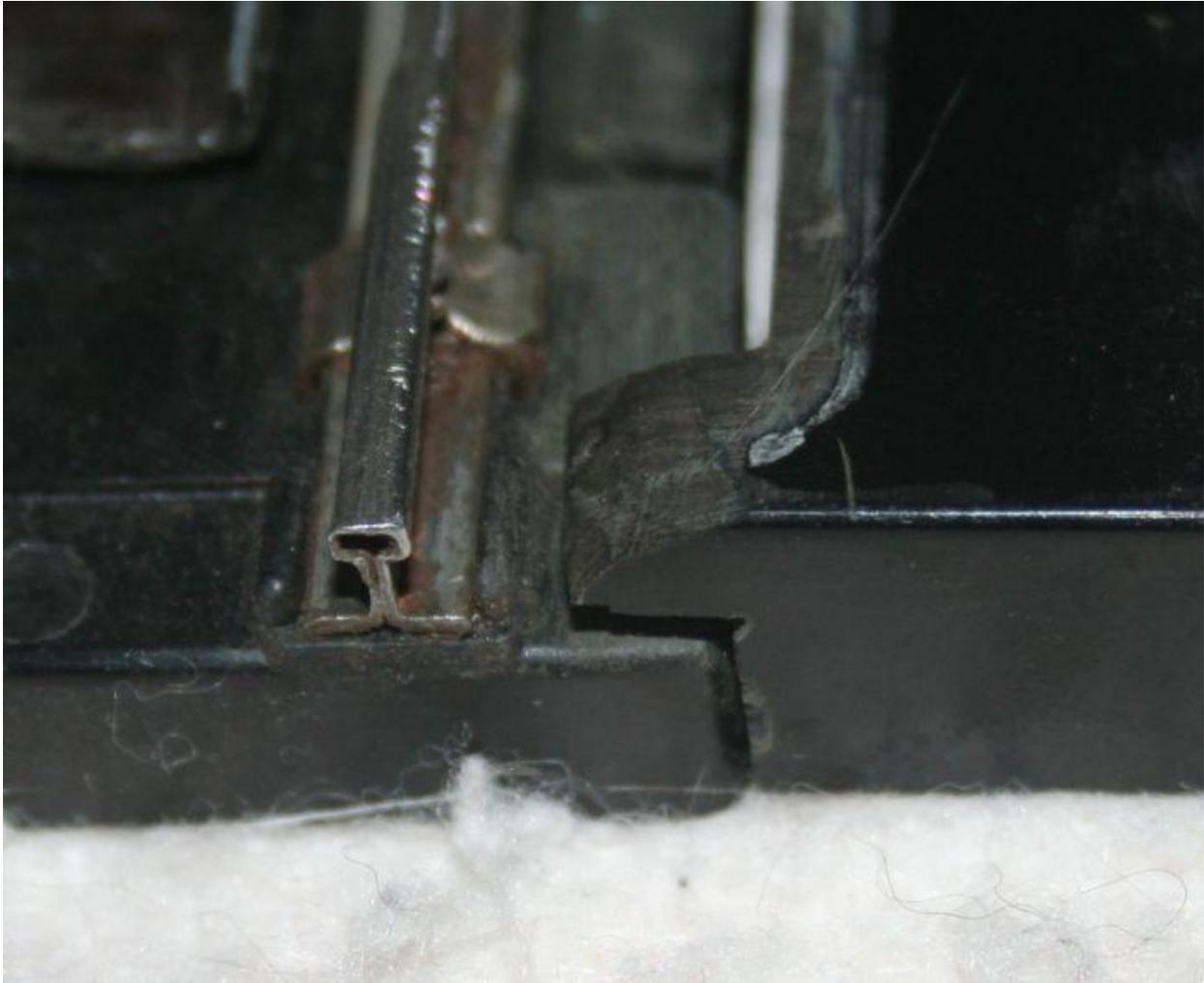


Photo 20 - Close up image of the notched base.



Photo 21 - Finished image of the notched base.

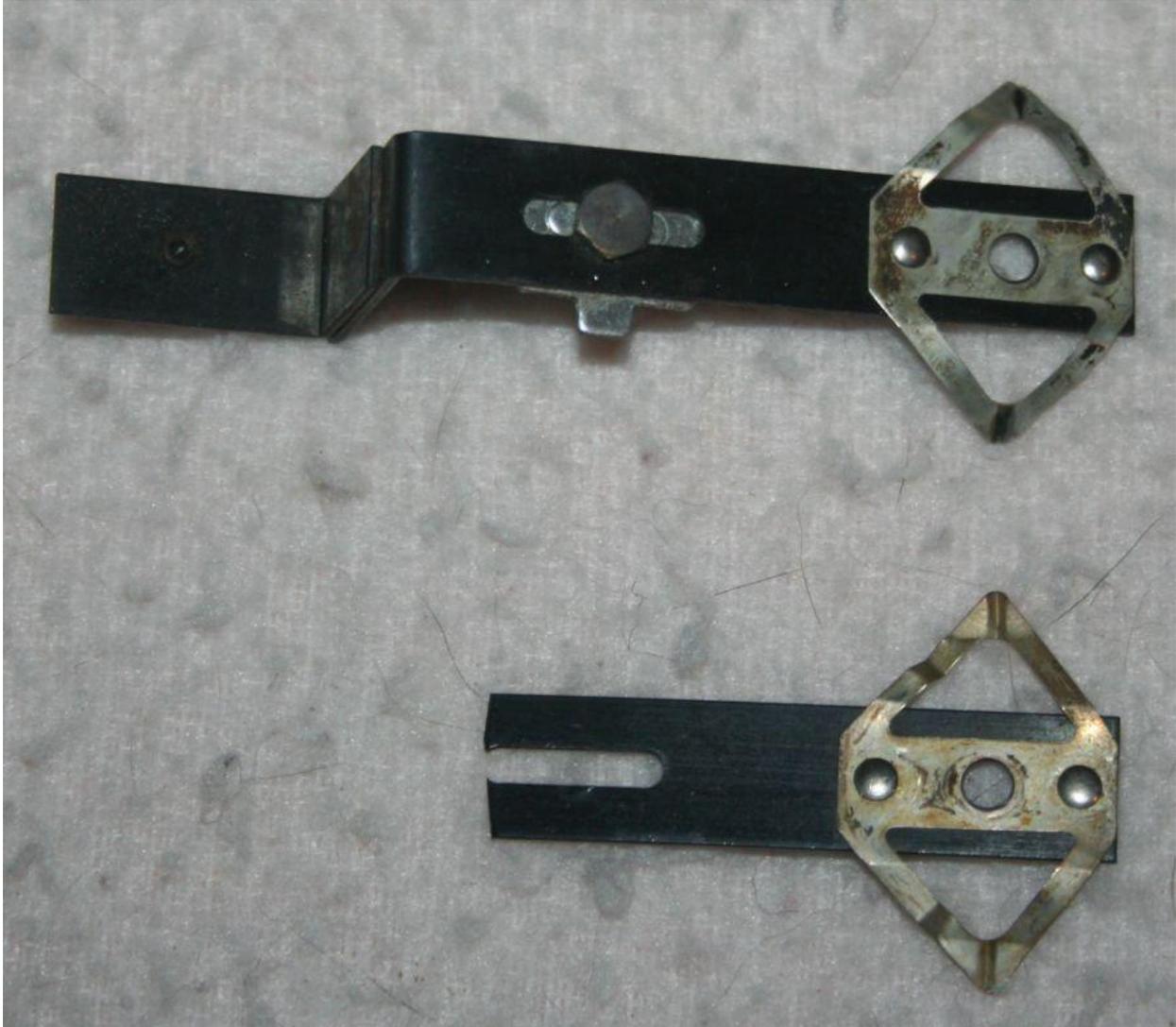


Photo 22 - Modification of the slide bar. The image illustrates the detent.

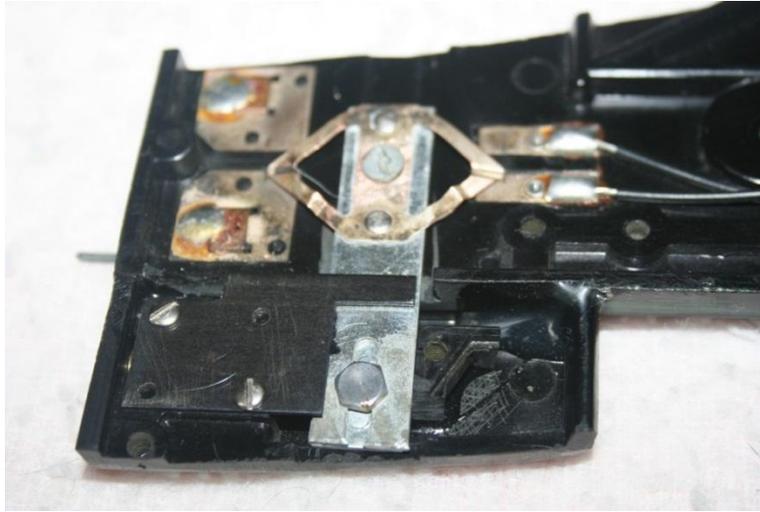


Photo 23 - The detent cover needs to be flipped and it requires two additional screw holds to be drilled.



Photo 24 - Some AF switches will need a custom made combination detent cover/slide bar retainer clip.



Photo 25 - Overview of a number of different modified switches.



Photo 26 - Switches #9 & 10 illustrates a close up of modified switches.



Photo 27 - Switch #11 is an older style AF switch with tombstone removed. Switch #13A has a straight section of track for the crossover and again the tombstone removed with a pair of under layout Tortoise switch machines.



Photo 28 - Switch #16 is a standard AF switch with the motor tombstone removed on the right. Switch #17 has a Tortoise switch machine and the 2-1/2" modification.



Photo 29 - This image illustrates with a little imagination and a cut off wheel, one can install a compact switch yard with reliable operations.



Photo 30 - This image illustrates a standard AF switch with a modification to the straight section of the switch. The curve section is “started” sooner thus saving space.



Photo 31 - The dirtiest, ugliest, rustiest, paintiest American Flyer Track before restoration.



Photo 32 - Before/After look of the AF track. After the spray paint has dried, a quick pass on a wire brush bench grinder and you have forever reliable operating Flyer track. All track shown in this article started as “throw-away” track. You can say that you are being “Green” by restoring otherwise unwanted American Flyer Track.