My Timesaver

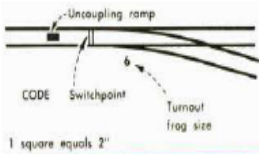
A tribute to John Allen

By Stephen Richardson

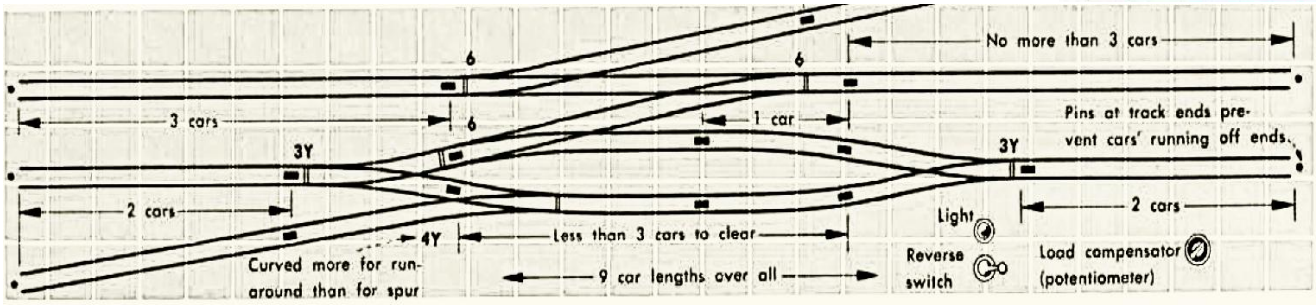
In November 1972 John Allen presented his Timesaver switching puzzle in Model Railroader magazine. The thought of building that has lurked in my mind since then. When I was finally able to justify the time and expense of building a layout, I tried to incorporate a timesaver in that work, but it just didn't fit with my other givens and druthers, or, honestly, my skills.

In the interim I have collected several more articles and related notes.

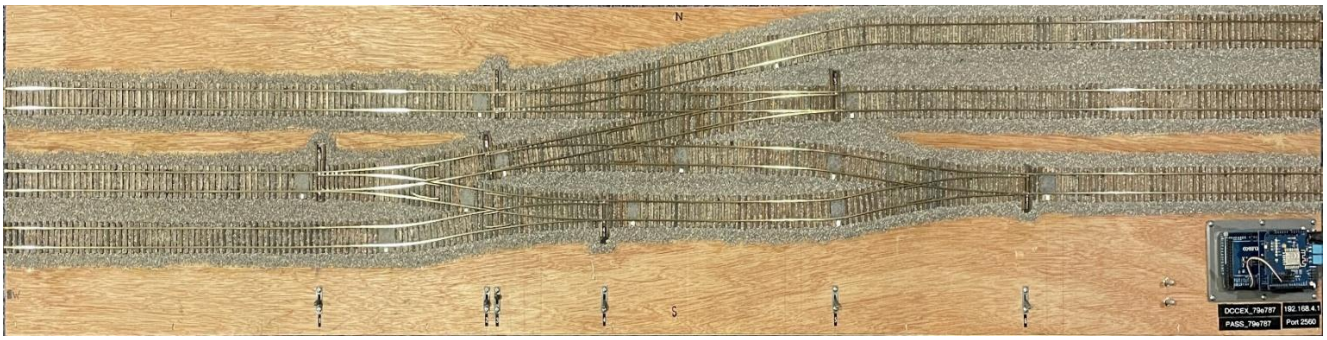
- 5 Ideas for a shelf layout - Steven Otte May 9, 2022, Model Railroader forum
- The Snap-Track Timesaver; Russ Cain; Model Railroader October 1976, p67-69
- One of my towns is a Timesaver; Ed Vondrak, Model Railroader, November 1977, p96-97
- The Timesaver in a loop; Ed Vondrak Model Railroader, February 1979
- HOn3 Timesaver; Bob McMahon; Model Railroader Information Station article on Trains.com
- John Allen's Timesaver revisited; Ed Vondrak; Possibly also from the Model Railroader Information Station article
- Switching in a small town; Peter Vassallo; Model Railroader September 2016



The time has finally come to make this real. Here is John Allen's diagram:



This is my version:



I had several goals in building this 'layout'.

- Handlay code 70 rail
- Manual thrown turnouts
- Magnetic uncouplers as invisible as possible
- Arduino DCC Controller with Wifi
- Learn switching strategy
- The challenge of building a new toy using unfamiliar technology.

Details

Roadbed: Previously I had used Homasote roadbed. It is easy to work with and holds spikes well, but it's messy and requires digging out power tools to machine it into shape. Milled homasote roadbed is available, but I did not have any in stock and I was looking for a more "economical" solution. On my last trip to purchase sheet plastic, I got a sheet of 1/8" thick expanded foam PVC. This can be cut with a knife or scissors with no mess. It seemed to hold spikes well, so that is what I used. Subsequently I have discovered that some of the stability of the spikes came from the underlying plywood even though they only extended about 1/32" into the plywood. When completed, the combination of glued ties and ballast, and spikes has served to hold the trackwork fast.

Manual turnouts: Initially I had planned to use Caboose ground throws, but I did not have enough in stock, and was concerned that finding suitable locations for them was difficult. I didn't want to reach around the cars and locomotive, potentially knocking them off the track, resulting in frustration and damage. The tolerances are tight for the rolling stock and human hands alike. I also had concerns about using 'finger flick' over-center springs on the throwrods. In my experience this can dislodge the points from the printed circuit board (PC) throwrods, ending the fun. The resolution was to design and build (3D print) "remote" levers and cranks. Details of the mechanism are discussed in a separate article.

Uncouplers: Following a lot of experimentation, I found a way to configure small, rare-earth magnets just under the rails that would allow using the uncoupling and delayed features of Kadee couplers. This was based on a review of "Totally Hidden Uncouplers" that I had saved from years ago. Details of the uncoupler background and design are in a separate article.

Controller: For me, electronics are magic, so I just had to try building a DCC controller with an Arduino using the instructions published on the dcc-ex.com Web site. Along the same lines, I wanted to use a retired iPhone throttle to run the trains. I was pleased to find that this simply works - just follow the published instructions. But, there's more: I have a NCE PowerCab that I connected so that the timesaver could be used for testing and programming locomotives, well, ones that can fit anyway. The attached NCE USB Interface allows connecting a computer with JMRI to interrogate and configure decoders.

Learn switching strategy: This is an on-going task. Fiendish is how this track configuration is often described, and that is accurate in my opinion. This small layout can provide hours of amusement.

Statistics:

- Cost:
    - Trackwork ~$100
    - Arduino Controller: ~90
- Time: Irrelevant. Many hours of design, experimentation, and build over several months.

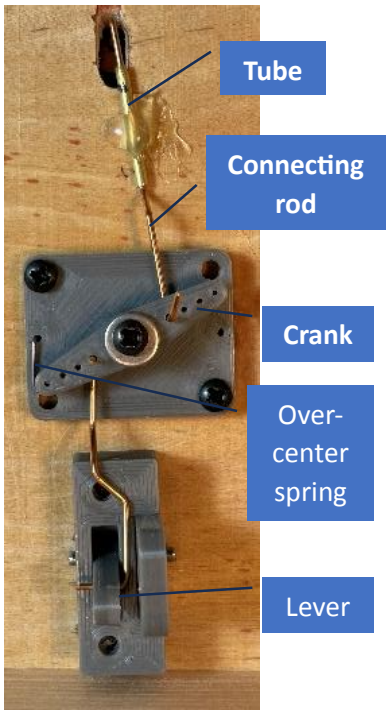
Manual Turnout Controls for the “Timesaver”

Stephen Richardson

I wanted simple control levers to enable switching on a copy of John Allen’s “Timesaver” module. The goal was that these levers would provide a snap action to hold the points, and that it would not be necessary to reach over the module to move them. I also wanted the mechanism to provide some protection against over jealous force from damaging the hand laid trackwork and end the game.

Pictured here are the top and underside views of one control. The components are the operator’s lever on the top side, and a crank assembly with over-center spring, and connecting rods underneath.

Top View

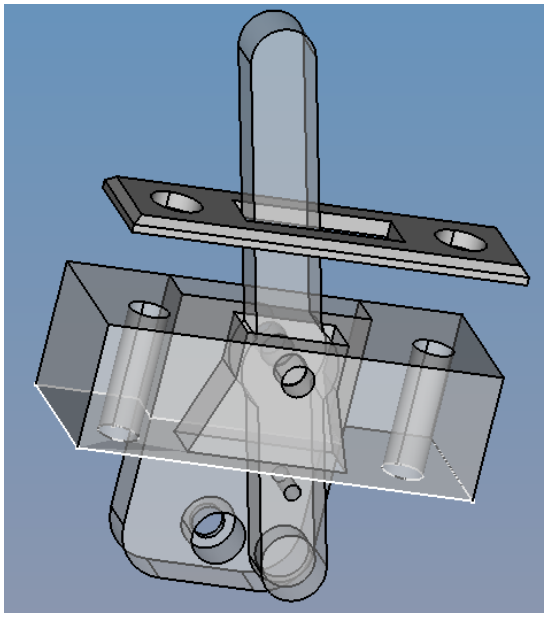


Under Layout View

The operator’s lever and crank assembly are 3D printed components made of FDM-printed PLA plastic using a Creality Ender 3V2 printer. PLA is easy to print and somewhat forgiving, however ABS may be necessary if the stresses are too great. The holes for the screws, pivots, and wires are printed undersized so that they can be drilled out to accurate dimensions.

The crank assembly translates the lever action so that the switch points move in the same direction as the lever. This part also provides a convenient location for the over-center spring that yields the snap action to move and hold the points in position. The spring is 0.020 inch music wire bent into a “v” shape with right angle bends at the ends that engage the crank and base. The “v” is ¼ inch deep.

The connecting rods are 0.032” Tichy phosphor bronze wire. This wire is a bit too flexible on its own, so it is run through 1/16th inch tubing to make the linkage stiffer where it bends up to engage the switch throwrod.



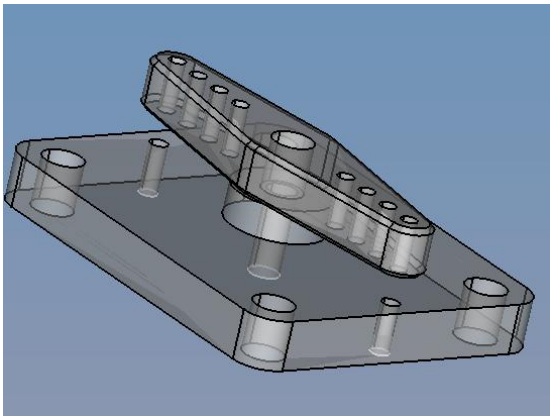
I expected to use magnets to force the operator’s lever to the end positions, and thus hold the switch points in position. However, I learned that even strong rare-earth magnets do not have sufficient force unless they are directly next to each other. I used 1/8” x 1/16” magnets glued into recesses in the lever and the lever base. The repulsion between these magnets forces the lever away from the center position, but provides little force at the end points. The magnets may contribute to the feel of the controls, but are insufficient to hold the switch points tight.

I considered switching the scheme to use attracting magnets to pull the lever to the two end positions, however I was concerned that the magnets would eventually pull themselves out of the recesses and

foul the mechanism. In the illustration, the recesses for the magnets are shown at the bottom of the base piece and lever. (3D printing hint: the part of the base that holds the magnet, the backstop, is printed separately in order to get a correctly dimensioned pocket for the magnet to be pressed in. It must be printed flat for that.)

A section of 2 mm diameter finishing nail is pressed into the base and lever to assemble this part. The hole in the lever is drilled out to allow free rotation.

The crank base center is drilled and tapped for a 2-56 bolt.



Note: all of this was designed to work on a module built on ¼" plywood. The crank will work on any thickness platform, but the lever will need some modifications to work on a thicker platform. Changes to the lever may dictate changes to the crank if the "throw" of the lever is longer than what the crank can accommodate.

Timesaver Uncouplers

By Stephen Richardson

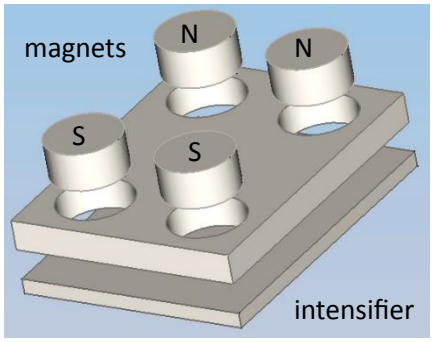
John Allen's "Timesaver" layout employs many uncouplers - 11 to be exact. In order for the switching to be fun, these need to be reliable. To this I added one more feature, I want them to enable the delayed feature of Kaydee uncouplers so that cars can be pushed to the end of the siding tracks. I also wanted the uncouplers to be out of view, buried in the roadbed.

Initially, I planned to use Kadee's under-track uncouplers. In order to make these fit in the confines of this track plan, they need to be cut much shorter - at least half of the stock length. The magnets can be scored and snapped as described in the Kadee directions, but when the steel intensifier plate is added, the thickness exceeded 1/8" roadbed on this layout.

Another option using rare-earth magnets was described in an article in the September 2007 issue of Model Railroad News. The manufacturer, S&L Enterprises in Sykesville, MD, is apparently closed, however some sets of these "Totally Hidden Uncouplers" are still showing as available on EBay. The article describes in detail how the uncouplers are assembled, which led me to believe that I would be able to cobble something together to do the job.

I purchased small rare-earth 5 mm diameter by 2.8 mm magnets on Amazon which will fit under the track. After a lot of fiddling, I learned that although they were strong, they would not move the couplers as I needed when positioned under the ties. Taking the hint from other uncoupler magnets, I cut a piece of steel to place under the magnets (cut from a Simpson Strong Tie plate). This got me much closer to the goal, but was not quite enough. I found that the magnets with the steel "intensifier" needed to be up against the bottom of the rails to cause the couplers to open.

A bit of experimentation was needed to find the best position for the magnets in the plane of the base of the rails. For these magnets, that is slightly wider than centered under the rails. Two sets of magnets are separated by 5/16" along the rail, and 1/2" between the rails. A plastic template was printed to hold the magnets in this position on the steel plate. The magnets must be oriented with the "north" ends under one rail, and the "south" ends under the opposite rail. In order to camoflage the uncoupler, a piece of 0.010" styrene sits between the magnets and the base of the rail.



Exploded view of the uncoupler

The uncoupling range is approximately the width of one tie - marked with a white spot on the tie. These were only tested with Kaydee 148 whisker couplers, I suspect that others may behave differently. Usually the uncoupling and delayed feature work, although sometimes a little help with a pencil, skewer, or similar tool is needed, especially for uncouplers located under turnouts. Some free rolling cars, especially hoppers with steel weights on the bottom, frustrate clean coupling and uncoupling as they are pulled by the magnets. Finally, the layout must be level to avoid unwanted movement when uncoupling.

I suspect that if the roadbed was thicker, doubling these magnets, and maybe the steel plate, would allow locating them under the ties totally out of view. As always, your mileage may vary….