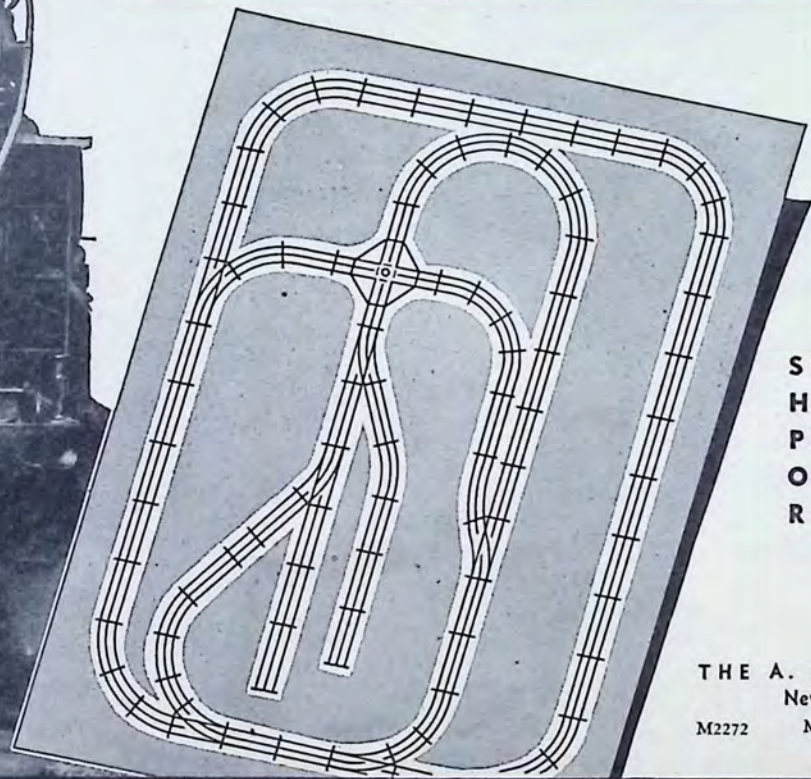


# Railroading — with **AMERICAN FLYER**



**SUGGESTIONS AND  
HELPFUL HINTS FOR  
PLANNING — AND  
OPERATING YOUR  
RAILROAD EMPIRE**

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New Haven, Conn., U.S.A.

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New Haven, Conn., U. S. A.

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# GILBERT AMERICAN FLYER ELECTRIC TRAINS

## PICTURE YOUR RAILROAD EMPIRE IN ADVANCE

In all the world of playdom, Miniature Railroading offers a pastime of never ending thrills and countless hours of pleasure.

There's something fascinating about our great railway systems and their charm reflects on the imagination and inventive genius of youngsters and grown ups with the resultant desire to imitate and reproduce. Such a desire can, and probably will, become an accomplishment with you now that you own an American Flyer Train, for you are actually at the very starting point to enjoy all the thrills that such a hobby presents.

Picture your train speeding over the rails, passing green lighted signals and semaphores—roaring through tunnels and over bridges and finally slowing down with a grinding of couplers and screeching brakes, as your station looms into view. Picture a scenic background with green fields, winding rivers, waterfalls and lakes—big cities and little towns nestling in the foothills along the right of way—tree-studded slopes with towering mountains and passes, and you have a panoramic view of your railroad amid the scenic grandeur of the great outdoors. You have something tangible to exhibit to your friends, something to view with pride—an example of your skill and handiwork. Such an achievement can easily become a reality, for American Flyer engineers and technical experts of the Gilbert Hall of Science have created dazzling new features in scale model trains and equipment for the further perfection and realism of miniature railroading.

On the following pages you'll find suggestions and helpful hints for planning and operating your railroad empire. Whatever your plan may be, build carefully, for precision and realism. You'll soon realize your hobby has an ever-widening horizon, that there's always something new to add, always something to keep your interest at highest pitch. There's a never-ending fascination in a hobby that carries all the romance of railroading—its air of adventure—its soul stirring sounds—its sense of mighty power that you, as the owner—the big boss or "Brass Hat" as they say in railroading—can control with a finger.

## PLANNING FOR OPERATION

In a short time, if not already, you will find that the operating facilities of your railroad empire are too limited. Expansion is in order and the Board of Directors must be approached for funds. It will be much easier to obtain this appropriation if a fairly definite plan of operation is laid out. Your railroad must have work to do in order to exist and you should decide now what type of service, passenger or freight, it is to give and what communities and industries it is to serve before you purchase new equipment or prepare your permanent right of way.

You now have a freight or passenger train. You can't leave the train on the main line so you'll need a freight yard or a coach yard. Leaving the station for a trip around town and back to the station is a rather aimless job for a railroad. Better lay tracks to the next town, at least. Keep in mind the fact that space must be allotted for future expansion.

The freight yard will eventually have a number of tracks and switches with an assortment of cars and a switcher scurrying back and forth picking up cars and backing them onto the make-up track where a transcontinental freight train is being assembled. A powerful locomotive steams up from the roundhouse and waits to be coupled to this freight. Over near the station a string of coaches stand, ready for a long journey. The train caller, baggage smasher and station hands become alert at the approach of the express. It stops at the station for a moment. Passengers board it while succeeding stops are announced and then amid hisses and chugs the speedy Hudson with its club car and Pullmans resumes its race against time.

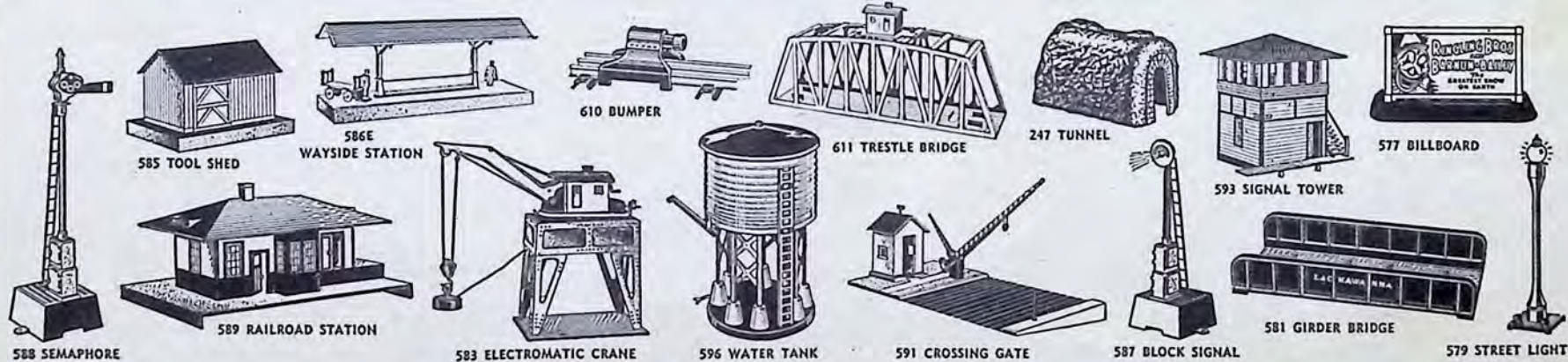
While it screams over a trestle and rushes through a tunnel, the block signals all show a green light indicating a clear road ahead. Meanwhile the freight gets a highball as the man in the signal tower clears it onto the main line. The signal lights, now red since the passing of the express, become green again and the freight train proceeds to a factory siding at the outskirts of town where it picks up a car of scrap iron just loaded by a magnetic crane. Thundering along, it crosses a highway over a massive girder bridge and pulls into an oil depot, uncoupling and leaving several tank cars of gasoline. As it travels on, it enters an open switch onto a passing siding. The switch is then thrown back to the main line leaving the train beneath a water tank, to fill its tender while the excursion train goes through to the Big City, drawn by a snappy K5-Pacific.

The excursion train finally reaches its destination. The express is now far out into the country whizzing by wayside stations and billboards, whistling as it approaches grade crossings protected by signals and crossing gates. It cuts across the tracks of a branch line with a great clatter of wheels, while the local stops to allow it to pass, and on it goes over miles of rail to some distant city. Meanwhile the freight leaves the siding and continues its journey towards its western terminal.

Every bit of this action is automatic or operated from a control board when you use American Flyer equipment. You sit in the dispatcher's chair with train orders before you and run your whole railroad system by simply pushing buttons and throwing levers. Of course, you probably won't be fortunate enough to have all this at once but you must start with a definite plan in mind, similar to the above system, and add to your present equipment, piece by piece, making each purchase increase your sphere of operations along the lines of your plan.



A TYPICAL MODEL RAILROAD LAYOUT SHOWING USE OF AMERICAN FLYER ROLLING STOCK AND EQUIPMENT



## PREPARING THE RIGHT OF WAY

Start your railroading on the floor. Quite a sizable layout can be used on the floor before the inconvenience of moving it outweighs the enjoyment. When your future layout is fairly well in mind commence looking for a place where it may be set up and left intact. The greatest pleasure is derived from your American Flyer Model Railroad when you have found a place in your home where your layout can be set up permanently. If there is a spare room available it makes an ideal location. The attic or cellar can be used provided there is a convenient electric light outlet. Room should be available for the expansion and development of your layout.

The first requirement of a permanent layout is a good substantial table. If the accompanying sketch (Fig. 1) is followed a firm table will result. The table top should be 30" above the floor and perfectly level and of an area that will provide space for the layout you intend to develop.

Most Ping Pong tables are satisfactory for use. Minimum track diameter being 40", table top should be not less than 44" wide. Note space required for different layouts as illustrated. Length of table is determined by the layout you decide to make.

When permanent layouts are not practical—by permanent layouts we mean a complete layout on a solid table which will not be moved—it is a good idea to mount track layouts perma-

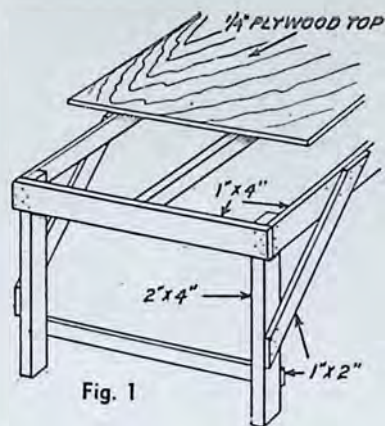


Fig. 1

nently to plywood panels so they can be picked up in sections and stored readily.

Plywood is the best material for the table top. It should be at least  $\frac{1}{4}$ " thick. Plywood is sold in sizes 4' x 8' and 5' x 9'. Wherever a joint is made between two pieces of plywood, it is best to place a 2" x 2" cross member under the joint. Before nailing down the table top it should be checked every way to see that it is level. (Table must be absolutely level for satisfactory train operation.)

Railroad right of way and sidings are usually covered with ballast (crushed stone, cinders, etc.). Slate covered roofing paper is a very suitable substitute in constructing your model railroad. It can be obtained from your lumber dealer. This paper comes in rolls and should be

laid out so that it will flatten itself before working with it.



No. 1—Space 67½" x 105" Track 24 Curve 11 Straight 2½ Straight 1 Crossover 1 Train Control Crossover

THIS LAYOUT ALLOWS THE OPERATION OF TWO TRAINS AT THE SAME TIME. A TRAIN CONTROL CROSSOVER IS USED TO PREVENT COLLISIONS



No. 3—Space 40" x 100" Track 14 Curve 12 Straight 1½ Straight 1 pr. of Switches



No. 8—Space 50" x 80" Track 16 Curve 12 Straight and 1 pr. of Switches



No. 4—Space 70" x 115" Track 24 Curve 22 Straight 5½ Straight 3 pr. of Switches 1 Crossover



No. 2—Space 40" x 90" Track 20 Curve 6 Straight and 2 pair of Switches



No. 7—Space 65" x 70" Track 5 Curve 5 Straight 1 Crossover 2½ Straight 1 pr. Switches



No. 5—Space 46" x 100" Track 21 Curve 14 Straight 4½ Straight 2½ Curve 1 Crossover and 1 pair of Switches



No. 6—Space 40" x 93" Track 18 Curve 4 Straight and 1 Crossover

Rails can be fastened directly to table top, but if mounted on roadbed strips, covered with roofing paper, give greater realism. Method of mounting sections of track is shown in Fig. 2.

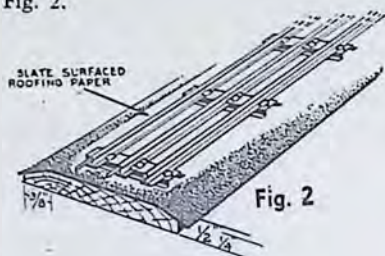


Fig. 2

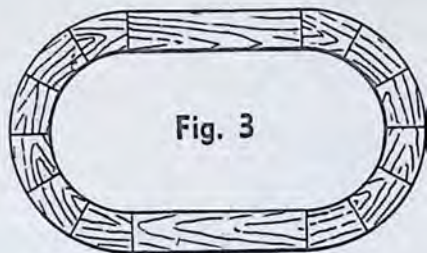


Fig. 3

The top surface of these boards should be  $7\frac{1}{2}$ " wide for double track or  $3\frac{1}{2}$ " wide for single track. The material used should be  $\frac{1}{2}$ " thick, well seasoned white pine or spruce. When constructing the curved roadbed make it up of small segments  $\frac{1}{12}$  of a circle as shown in Fig. 3. When laying out curved roadbed for double track operation, be sure to temporarily place your track so that you can cut your wood segments for the roadbed correctly. Cover the

roadbed with grey slate surfaced roofing paper and you will have a Tru-Model roadbed. Illustrated are suggested "O" gauge track layouts and with each is given the table space required, track and equipment needed.

For best results the track sections should be fastened down with wood screws using the holes provided in the ties. Do not tighten down on the screws to the extent that the roadbed is distorted.

Along one side of your table top, space should be provided for a control panel upon which you should mount your transformer and controls. Lead wires from your control panel, if so desired, can be placed on the underside of the table, being led to the top surface through holes at points where controlled equipment is placed. A good temporary arrangement for these lead wires is to wind them around a pencil. When the pencil is removed the coiled wire can be stretched between the two points to be connected without leaving a lot of slack wire on your layout. (See Fig. 4.)

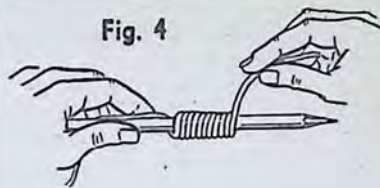


Fig. 4

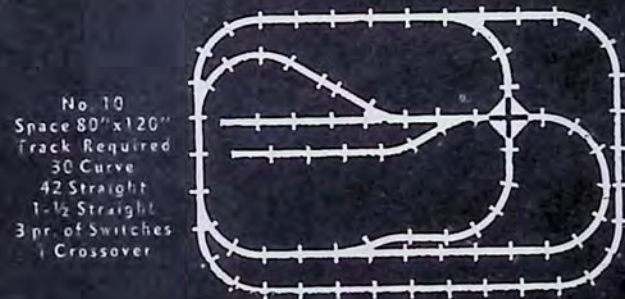


No. 9 — Space 50" x 90" Track 32 Curve  
18 Straight and 2 pr. of Switches

A FINE LAYOUT FOR A LONG ROOM. USE TABLES IN TWO CORNERS WITH A CONNECTING SHELF AGAINST THE WALL SINGLE OR DOUBLE TRACK AS SHOWN. MAIN LINE WITH REVERSING LOOP AT EACH END.



No. 13  
Space 70" x 140" Track Required  
28 Curve  
22 Straight  
3-1/2 Straight  
3 pr. of Switches



No. 10  
Space 80" x 120" Track Required  
30 Curve  
42 Straight  
1-1/2 Straight  
3 pr. of Switches  
1 Crossover



No. 14—Space 60" x 85" Track 20 Curve  
10 Straight and 1 pr. of Switches



No. 12—Space 50" x 90" Track 20 Curve  
10 Straight and 1 pr. of Switches



No. 15—Space 45" x 90" Track 22 Curve  
6 Straight and 2 pr. of Switches

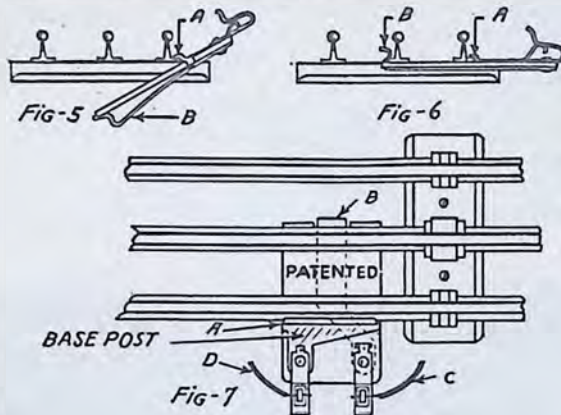


No. 11—Space 40" x 90" Track 20 Curve  
and 2 Straight

## HOW TO SET UP A TRACK LAYOUT

Having decided which layout you wish to assemble, lay the separate pieces of track flat on table and join by inserting the pins of one section as far as they will go in the openings of the next section. **CAUTION:** Push together. Do not twist, bend or squeeze. When attaching the No. 450 Track Terminal to a section of track, put shoulder, shown at "A," against bottom of the outside rail as in Fig. 5. Press spring shown at "B" up and around bottom of center rail as in Fig. 6. Take wires shown as "C" and "D," Fig. 7, strip off about one-half inch of insulation from each end of wire, and connect clip "D" marked Base Post to the Base Post Terminal on your Transformer. Connect the other wire to clip "C" and then to your transformer terminal marked 7 to 15 volts. If the terminal is used to supply track current to a piece of equipment, the wires "C" and "D" are connected to the two terminals on the equipment unless equipment instructions read otherwise.

If your equipment makes use of dead sections of track for its operation, now is the proper time to remove the steel pins



and insert the fibre pins supplied with the equipment. The steel pins can be removed with a pair of pliers by holding the section of track in your hand and gripping the pin with the pliers. Pull straight out so as not to distort the rail end. The location of this change is given in the instructions accompanying the equipment.

## SCENERY ALONG THE RIGHT OF WAY

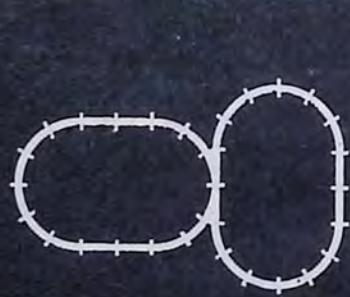
With the expenditure of a small amount of money an astonishing variety of scenic effects can be constructed. Railroad yards, highways, farms, forests, and mountains are easily built with ordinary household materials.

Additional realism can be obtained by using train figures around Stations, Crossing Gates, etc. Get a No. 578 Station Figure Set consisting of six hand painted railroad workers, platform truck with baggage and two milk cans.

In one section of your layout you will want your railroad yard with its No. 593 Signal Tower commanding a view of your switch layout. On sidings you can have your coal pocket and a No. 583 Electromatic Crane for loading your Gondola Cars. Several oil storage tanks can be made from sections of round cardboard boxes used for oats or salt. This set up against a background of tenement houses should make a realistic setting.

On the highway leading out of the railroad yard where it crosses the tracks a No. 591 Crossing Gate could be used, blocking the path of small automobiles, such as are found in any Toy Store, while your train passes. The highway is made of strips of wood painted a grayish white, its seams marked off with black paint, representing tar. Along the highway a fence can be constructed of thin wood shaped up with a penknife and glued together.

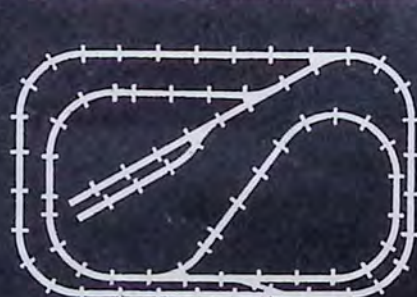
The highway could lead to a rural section, where trees and foliage can be assembled using a supply of twigs and dry weed roots. These pieces should be dipped in shellac and, when tacky, shaken around in a cardboard box containing finely chopped-up yarn of suitable shades



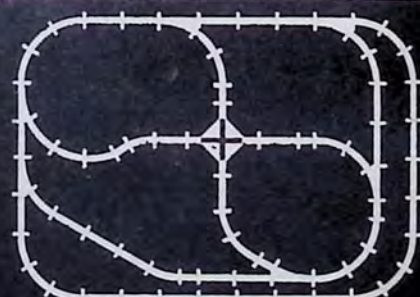
No. 17 — Space 60" x 100" Track 22 Curve  
6 Straight 1 pair of Switches



No. 16 — Space 80" x 120" Track 28 Curve 30 Straight  
3-1/2 Straight 2 pair of Switches 2 Crossovers



No. 18 — Space 70" x 110" Track 28 Curve  
39 Straight 4-1/2 Straight 3 pair of Switches



No. 19 — Space 80" x 110" Track 29 Curve 28 Straight  
6-1/2 Straight 3 pair of Switches 1 Crossover

of green. Make-believe grass can be made by using sawdust dyed green scattered on over wet green paint. For weeds, select a good variety of weeds from the nearest vacant lot and dip them in green paint of varying shades. Sand will make a good imitation of gravel and should be sprinkled over a coat of shellac.

A cornfield can be accomplished by removing one side of a piece of corrugated board, such as packing boxes are made of, exposing the ripple surface. To represent earth spread a thin mixture of crack filler over the entire surface. Small pieces of grass stalk should be inserted to represent stubble, and bundles of longer pieces of grass will represent shocks of corn.



A piece of window glass, painted blue-green on the underside to represent water, makes an excellent river or lake, (See Fig. 8). A realistic shoreline may be obtained by spreading crack filler around the edges, or by cutting an irregular shaped hole in the table and fastening the glass beneath it. A small boat and a wharf or bridge will complete this interesting feature.

Mountains serve as a most suitable background for your rural scenery. They are not too difficult to make. A rough frame covered with paper or wire mesh, or even heavy sheathing paper purchased from any lumber company and crumpled into a satisfactory shape, supplies the foundation. Over this pour a mixture of asbestos plaster or of crack filler and mold it into

the desired contours. Allow a day for it to dry before applying paint. Water colors or artists oil colors may be used. Choose shades of green, brown, yellow and blue which fit the scene you wish to reproduce. By copying nature's color-scheme and blending carefully where two colors come together a very real and satisfying effect will be obtained.

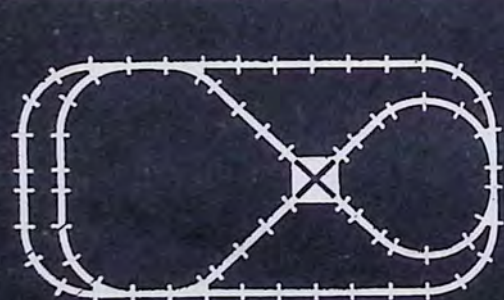
## POWER SUPPLY—SAFETY FIRST TRANSFORMERS

Before purchasing a transformer, it is necessary to know the type of current which you have in your home. If you are not absolutely sure of this, your electric light company will be only too glad to tell you the voltage and whether it is Direct Current or Alternating Current and if A.C. the number of cycles. This information is important in order that you may select the proper transformer for your train operation.

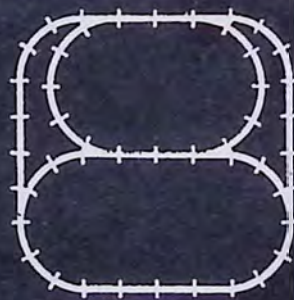
While these factors determine the type of power supply you need, the wattage is determined by the size of your electric trains and the number of accessories you have. The wattage of a transformer is a measure of its capacity. The higher the wattage, the larger the train and the more equipment it will operate.

AMERICAN FLYER Transformers are manufactured in five wattages—50, 75, 100, 150 and 250 watts. Consult the latest American Flyer catalog or your dealer for full information as to the proper transformer to be used with your train layout. It is always best to purchase a transformer with greater wattage than the one required to operate the train alone. In this way, you will be able to provide adequate current for the operation of any additional equipment which you may later decide to use on your railroad. All American Flyer Transformers have a 15 volt maximum output. In determining what transformer to use, make your selection based on the amount of wattage and not on the voltage.

All American Flyer Transformers except the No. 3, No. 5 and No. 6 are equipped with an Automatic Circuit Breaker. When a short circuit or overload occurs the red pilot lights and



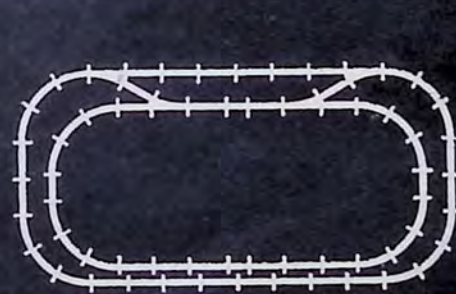
No. 20 — Space 65" x 130" Track 22 Curve 4 - 1/2 Curve  
26 Straight 5 - 1/2 Straight 3 pair of Switches 1 Crossover



No. 21—Space 80" x 80" Track 24 Curve  
14 Straight 3 pair of Switches



FOR TWO TRAIN OPERATION WITH TRAIN CONTROL CROSSOVER  
604 → ← 602  
No. 22—Space 62" x 80"  
Track 22 Curve 4 - 1/2 Curve  
4 - Straight 1 - 602 Crossover  
1 - 604 Train Control Crossover



No. 23 — Space 60" x 120" Track 24 Curve  
32 Straight 2 - 1/2 Straight 2 pair of Switches

the breaker opens the circuit to prevent damage to the transformer. The No. 5B does not have this red pilot light but does have the circuit breaker. When the short or overload has been cleared the breaker is reset by simply pushing the "Reset Button" located on the top of the transformer. The Circuit Breaker protects both the 7 to 15 volt circuit and the 15 volt constant circuit against short circuit or overload. This desirable feature can be obtained in conjunction with the No. 3, 5 and 6 Transformers by the use of the No. 11 Circuit Breaker.

The No. 8B, 9B and 12B Transformers are equipped with a green "Power On" indicating pilot light.

The No. 9B and 12B Transformers have a line switch which can be used instead of pulling the plug to shut off the power supplied to the transformer when it is not in use.

The No. 9B and 12B Transformers are Dual Transformers. They have two control levers and two corresponding sets of three terminals. Each throttle operates separately, thus permitting the operation of two or more trains simultaneously on two layouts (Fig. 9), or two trains simultaneously on two sections of the same layout as shown in Fig. 10.

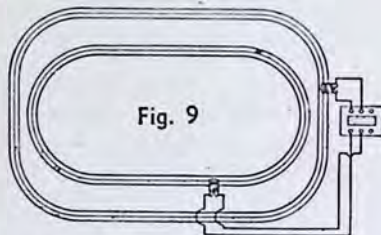


Fig. 9

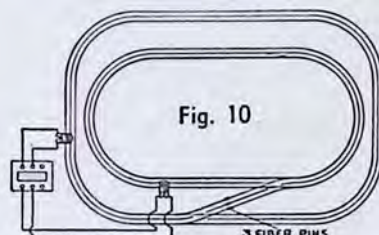


Fig. 10

### AMERICAN FLYER TRANSFORMER DATA

Transformer No.	A.C. Voltage	Capacity	Frequency	Variable Voltage Range	Fixed Voltage
3	115	50 Watts	60 Cycles	7-15 Volts	15 Volts
5	115	50 "	60 "	7-15 "	15 "
5-A	115	50 "	25 "	7-15 "	15 "
5-B	115	50 "	60 "	7-15 "	15 "
6	115	75 "	60 "	7-15 "	15 "
6-A	115	75 "	25 "	7-15 "	15 "
7-B	115	75 "	60 "	7-15 "	15 "
8-B	115	100 "	60 "	7-15 "	15 "
9-B	115	150 "	60 "	7-15 "	15 "
12-B	115	250 "	60 "	7-15 "	15 "

### 25 CYCLE TRANSFORMERS

For 25 cycle Transformers, American Flyer offers the No. 5-A and 6-A. These have the same respective wattage rating as No. 5 and 6, and the No. 11 Circuit Breaker can be used with these Transformers.

## TRANSFORMER CONNECTIONS

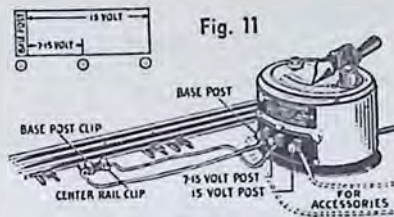


Fig. 11

The method of connecting our transformers to the track is shown in Fig. 11. By connecting accessories to the 15 volt Post and the Base Post of the transformer the accessory is supplied with a constant 15 volts that is unaffected by the position of the regulating lever.

When the No. 11 Circuit Breaker is used, the hook-up is as shown in Fig. 12.

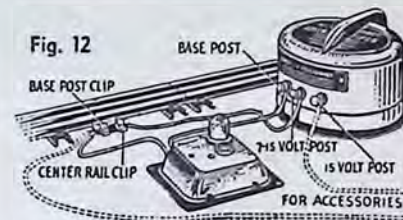


Fig. 12

## DIRECT CURRENT INVERTER

If the electricity supplied to your home is 105-115 volts Direct Current (D.C.), you will require our No. 10 Direct Current Inverter as well as a Transformer. If you have Direct Current which would necessitate the use of our No. 10 Inverter, follow the circuit as shown in Fig. 13.

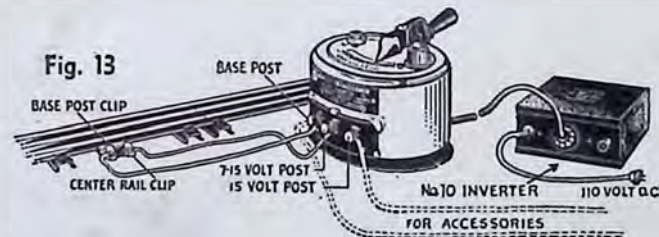


Fig. 13

## STANDARD REMOTE CONTROL

American Flyer Locomotives are made with two distinct types of reversing control. The Standard Remote Control and the Directional Remote Control. The direction of all American Flyer Locomotives equipped with Standard Remote Control can be governed from a distant point. This unit has a sequence reversing switch and performs a cycle of four steps, forward, neutral, reverse and neutral. If the locomotive is moving forward, and the current is turned off, then on, the train will stop with lights illuminated. If the current is again turned off, then on, the train will reverse. To make the train go forward again it is necessary to repeat these operations, in other words, the current must be turned off and on twice.

You can turn the current on and off by moving the lever of the transformer. If your transformer is equipped with a reset button you can use it in place of the lever.

To make the control inoperative, that is, to make the train continue in the same direction, irrespective of the number of times the circuit is broken, shift the locking lever protruding from the locomotive near the control unit. This locks the control. The lever must be moved into the locking position while the current is on and the locomotive is proceeding in the desired direction.

## DIRECTIONAL REMOTE CONTROL

What is the difference between Directional Remote Control and Standard Remote Control?

The advantages of Directional Remote Control are:

1. If you stop a train and start it again, it will go in the same direction as when you stopped it. In other words, if it was going forward it will be going forward again. If it was going backward, it will continue to go backward. With Standard Remote Control, if you stop a forward moving train, it will go backwards slightly before you can make it go forward.

2. If train is shorted, when short is corrected, train will continue in the same direction as it was going when it stopped.

3. Directional Remote Control has a big advantage when used in connection with Block Signals, a-Koostikin and other train controlling equipment. When train is stopped, it will start in the same direction when equipment automatically causes it to proceed. At the same time you can control your train in either direction. In other words, the equipment controls the train without affecting the reversing of train.

When locomotives are equipped with Standard Remote Control it is necessary to lock the control to enable train to operate automatically with above mentioned equipment.

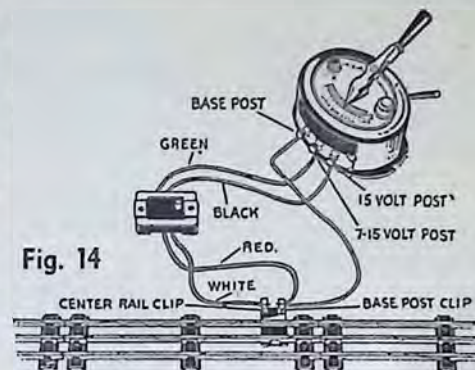
A special control button is furnished with all Directional Control trains which will be wired exactly as shown in Fig. 14. After the proper connections have been made, pushing the button will introduce an impulse which operates the control switch in the locomotive. The control is effective on all speeds of the train. The best way to stop the locomotive is by moving the transformer throttle lever to "Stop." When starting again, the train will proceed in the same

direction as it was formerly going. When stopping the train in this manner, the lights on the train and all accessory equipment connected to the track will be off. The train may also be stopped by pushing the Directional Control Button once. In this manner, the train will stop with lights on and all accessories will be working. To start the train in the same direction again, three consecutive instantaneous operations on the button are necessary. If the train is to be reversed from the stand-still, only one operation on the button is required.

Directional Remote Control can only be used in connection with transformers having a fixed 15 volt terminal or a 14 to 25 volt terminal. If you have a 4 or 5 post American Flyer Transformer connect the black wire to the 14-25 volt post.

Directional Remote Control will *not* function if train is operated on Direct Current (except by using inverter) and will not operate on 25 cycles Alternating Current.

Sometimes it may be desirable to change the direction of the locomotive without using the control button. This can be accomplished by pushing a nail, pin or wire down into the small hole that is in the top of the locomotive boiler. This is convenient when some train operation is being conducted at a distance from the control button. The current must be on when using this auxiliary method of control.



## IMPORTANT EXCLUSIVE FEATURE

Two trains can be run and individually controlled on the same track at the same time. Here is how it's done.

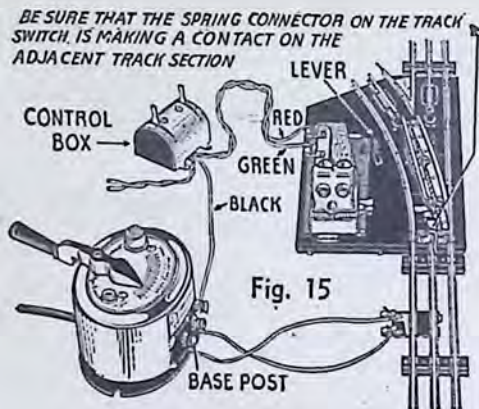
Use one Standard Remote Control locomotive and one Directional Remote Control locomotive.

Use an 8B, 9B or 12B Transformer connected with the track in the manner called for in your Directional Remote Control hook up. The reset button on your transformer changes the direction of the Standard Remote Control locomotive and the Directional Control push button changes the direction of the Directional Remote Control Locomotive. The transformer throttle controls the speed of both locomotives. This permits you to

1. Keep one train at a standstill on the track while moving the other train forward or backward.
2. Run both trains at the same time in the same direction.
3. Run both trains at the same time in opposite directions.

## EQUIPMENT

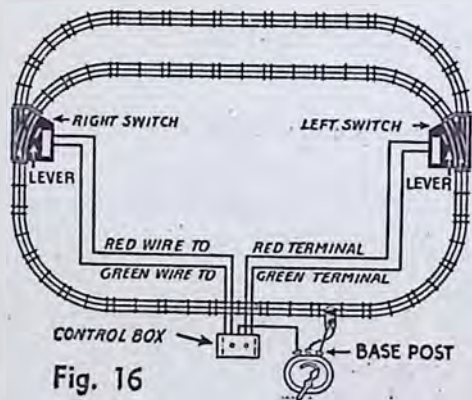
American Flyer Trains can be coupled, uncoupled, reversed in direction, stopped and started again in the same direction, switched from one track to another, caused to operate on the Dead Block System with one or more trains on the same layout; all this can be controlled from a central point any distance from the tracks.



American Flyer No. 688 Remote Control Switches are really two types of switches in one, that is, they can be used in the regular manner or by simply moving a lever, two trains can be operated at the same time without the use of special control buttons or block signals.

To use the switches in the regular manner move the lever to the end of the slot marked "Regular."

To operate two trains on the same layout at the same time, move the lever toward the end of the slot marked "Two Train Operation." With the lever in this position, on all the switches in your layout, trains will operate only on the loop the switches are set for. If the switches are set for the inside loop any train which happens to be on the outside loop will stop. When the switches are reset for the outside loop the train in this loop will start and the train in the inside loop will stop. See Fig. 16.



When the switches are set for two train operation they *must* be operated in pairs, that is, they must both be set for the same loop. The exception to this rule is when a switch is used at the junction of a spur line to the main line. A spur line is a dead end siding

and is a convenient place to sidetrack a train while you operate the rest of your railroad.

When a layout such as shown in Fig. 17, is set up, it is necessary that diagonal switches be operated in pairs, that is, No. 1 and No. 2 or No. 3 and No. 4.

Track Terminal must be placed where setting of switch will not isolate it from main part of layout.

The American Flyer No. 604 Remote Control Crossover enables the operator to operate two trains on a layout where the rails cross at two points. Set up the layout as shown in Fig. 18 and wire up the control as follows:

Connect the outside clips on the crossover to the outside clips on the control box using the YELLOW wires.

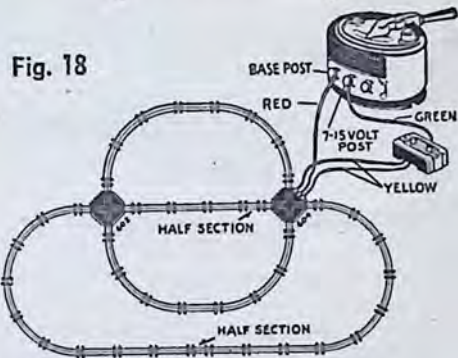
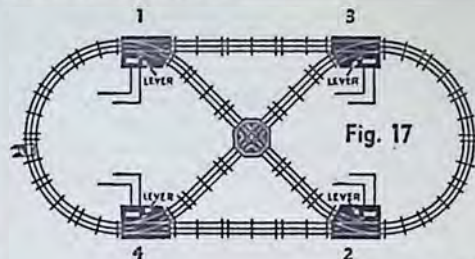
Connect the center clip of the crossover to the base post of the transformer using the RED wire.

Using the GREEN wire, connect the center clip on the control box to the 7-15 volt terminal on the transformer.

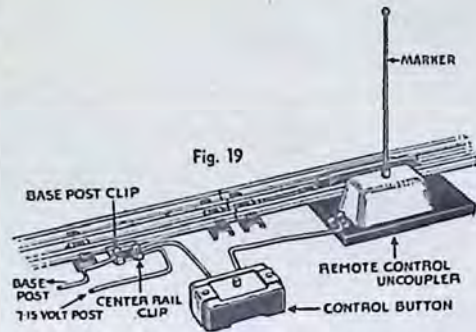
Place a train in each loop and set them in motion. Locomotives with Standard Remote Control must have the locking lever set so that they continue to operate in one direction only. The trains can now be controlled by pressing the buttons. As the trains approach the intersection and are in danger of colliding, press one of the buttons; this will stop one of the trains. When the other train has passed, release the button; this will set the first train in motion again.

Equipment necessary for the layout shown in Fig. 18 as illustrated is: 24 curved, 11 straight, 2 half straight, 1 No. 602 Crossover and 1 No. 604 Remote Control Crossover.

American Flyer cars automatically couple on curves, sidings, switches or anywhere on your layout and do so without the use of clumsy and unsightly coupling devices. By simply backing up your train to the car you want to pick up, the couplers snap together and if you reverse your locomotive to move forward you have your train assembled. To uncouple cars automatically is just as simple.



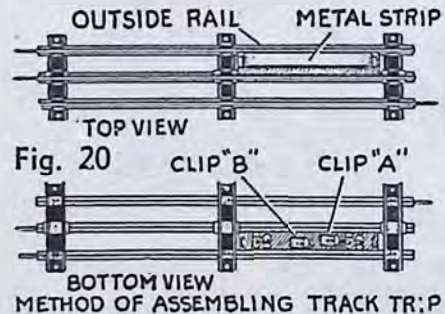
The No. 675 Remote Control Automatic Uncoupler is easily installed. Remove a section of straight track from your layout and replace it with the uncoupling unit. Connect one end of the long wire to the clip on your uncoupler. Connect the other end to one of the clips underneath the control button. Connect one end of the short wire to the remaining clip under the control button. Connect the other end of this wire to the center rail clip of the track terminal.



The uncoupler is now ready to operate. As the cars pass the marker press the button and the center part of the uncoupler will snap up uncoupling the cars as they pass over.

The No. 674 Manual Control Uncoupler operates in the same manner except a hand lever is used.

Automatic couplers, to function properly, should be 1/16" above the center rail (uncoupled). Whatever adjustment is necessary can be made by bending the coupler strip slightly.



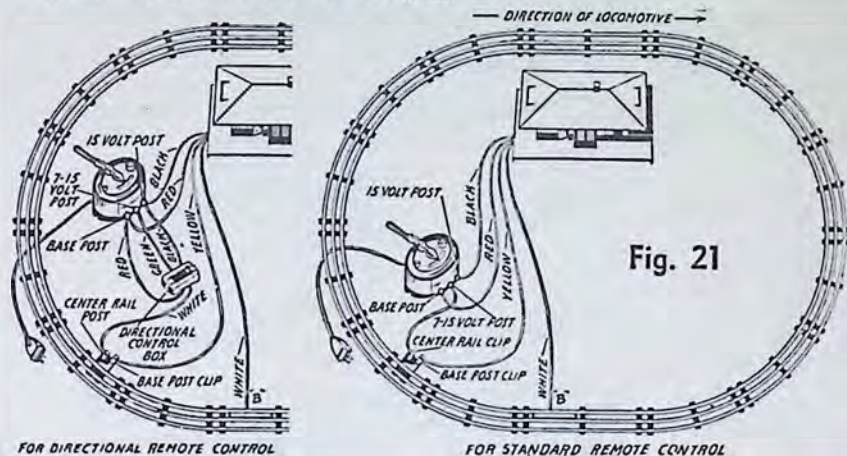
Clip "A" is the live (center rail) connection. Clip "B" makes the ground connections when contacted by train wheels.

The No. 677 Automatic Track Trip is used in several equipment setups, for instance the No. 591 Crossing Gate and the No. 597 a-Koostikin. The track trip must be assembled in a section of straight track so that the metal strip is close to the outside rail as shown in Top view, Fig. 20. CAUTION: Metal strip must not touch outside rail. If the Track Trip does not spring securely into place, slightly bend the four bronze clips (shown in bottom view of Fig. 20) towards the rails.

## AUTOMATIC EQUIPMENT

For uncanny realism on your model railroad the No. 597 a-Koostikin Talking Station is the last word. This station automatically stops your train, actually calls stations, reproduces typical train noises and then starts the train again.

Connections are made as shown in Fig. 21.

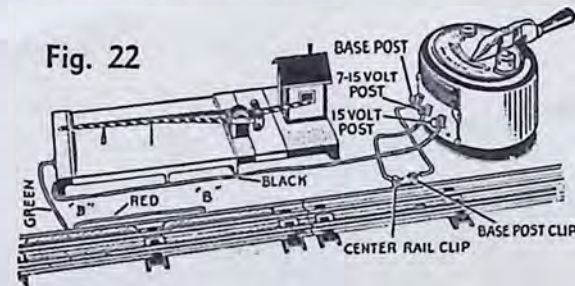


FOR DIRECTIONAL REMOTE CONTROL

FOR STANDARD REMOTE CONTROL

Note: Base post connection is made through station.

Set the Remote Control so that the locomotive will always move forward. A few trials will indicate the proper location of the station. On a small layout the station may operate only on every second revolution of the train. If you have a 4 or 5 post American Flyer Transformer connect the black a-Koostikin wire to the 7-14 volt post.



If you wish to extend the time that the gate is closed, simply move the trips farther apart. Do not allow the train to remain standing on the trips.

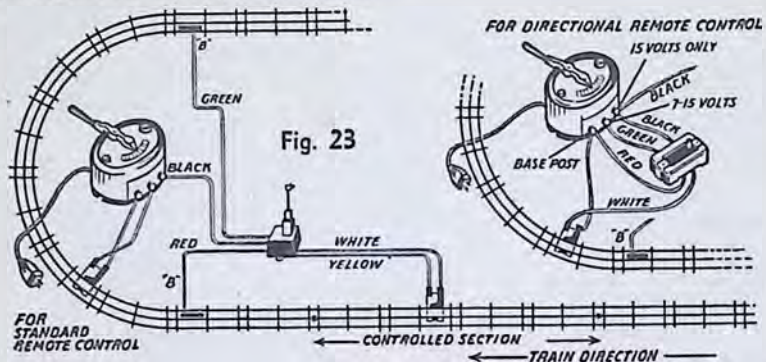
With track trips connected as shown in Fig. 22, the No. 591 Crossing Gate is ready to operate. As the train passes over the trips, the gate will go down and the red lantern light up. After the train has passed the gate will automatically rise.

If you wish to extend the time that the gate is closed, simply move the trips farther apart. Do not allow the train to remain standing on the trips.

An automatic block signal system is easily installed on your road with the No. 587 Block Signal. It permits operation of two trains on the same track safely, without collision.

As a train enters a block the signal automatically shows a red light and opens the circuit in the controlled section, preventing the second train from following it into that block. As the first train clears that block and enters the next, the red light changes to green and closes the circuit allowing the second train to proceed, thus maintaining a clear block between the two trains.

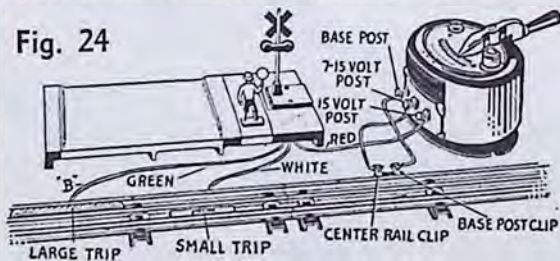
See Fig. 23 for the proper connections.



The metal pin in the center rail is replaced by a fiber pin at each end of the controlled section. For worm drive locomotives this controlled section may be shorter. Set the Remote Control so that the locomotive will run in forward direction only. If your layout is quite large it may be divided into a number of blocks having a controlled section and block signal for each one.

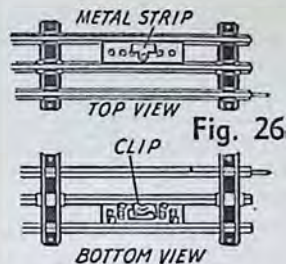
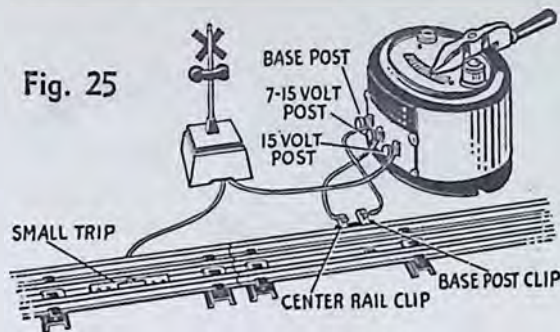
The No. 588 Automatic Semaphore can be used in place of the No. 587 Block Signal. It controls the trains in the same manner and is hooked up as shown in Fig. 23. This signal, besides showing a red or green light, indicates the condition of the block by the position of the semaphore arm, which may be seen from any direction.

The No. 584 Bell Danger Signal (Fig. 24) and the No. 582 Automatic Blinker Signal (Fig. 25) use a special track trip (Fig. 26) to operate the blinker. It is attached in the same manner



as the regular trip. As the train passes these signals the two lights blink realistically and, in the No. 584, a warning bell rings until the train has gone by.

Fig. 25



If you have a 4 or 5 post American Flyer Transformer connect the wire from the signal to the 7-14 volt post instead of to the 15 volt post as shown.

Place the No. 594 Animated Track Workers next to the track with the trips connected as shown in Fig. 27. Turn the man tending the compressor so that he faces it and the track gang will start to work. As the train passes over the trips the watchman comes forward and the tamper operators move back. When the train has passed they go back to work.

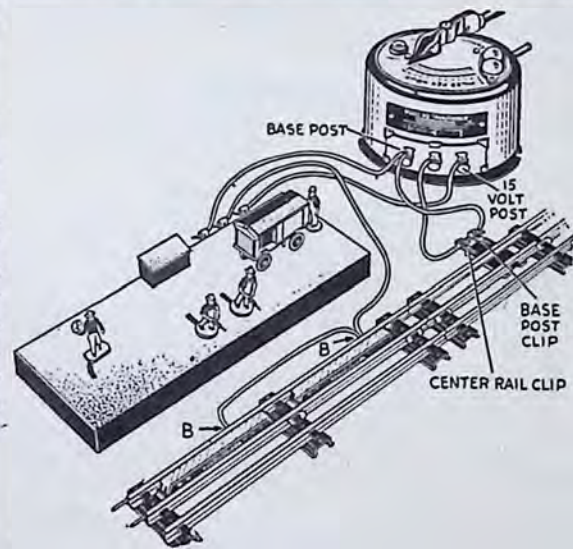


Fig. 27

## REMOTE CONTROL EQUIPMENT

If you want to add Whistling to your train layout, it can be done in two ways. By purchasing either the No. 577 Billboard type or the No. 490 Whistling Express Car.

The No. 577 Billboard Whistle will operate automatically, by a track trip placed at a predetermined point, and manually, by remote control, at any time. It is placed in your track layout as scenery, and can be used with any train set and operated in connection with any equipment. Fig. 28 shows the proper connections.

If you have a 4 or 5 post American Flyer Transformer the yellow wire should be connected to the 7-14 volt post or to the "A" clip of the track trip.

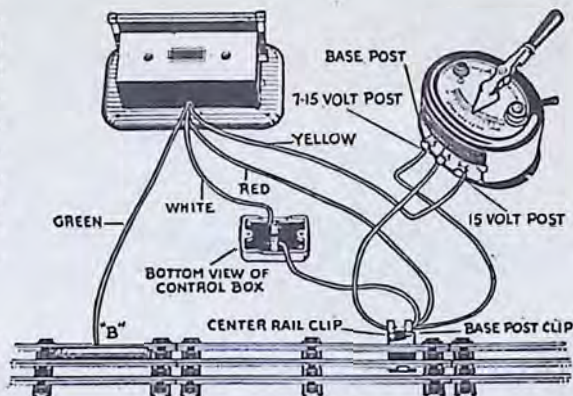


Fig. 28

The No. 490 Whistling Express Car. The Whistle was built into this Express car for the reason that it is not practical to include a whistle in every style tender that goes with various locomotives and still have these tenders authentic in design. This Whistling Express Car can be added to any Standard Remote Control Train. It cannot, however, be used in conjunction with Directional Remote Control or trains operating on 25 cycles. When you have either of these conditions, use the Billboard Whistle.



The "CHOO-CHOO," built into the tender of several American Flyer Trains, is a device which realistically reproduces the puffing of a locomotive. The lever located at the bottom of the tender cuts out the mechanism if the sound is not desired. May be used with any train.



The No. 583 Electromatic Crane will load your gondolas with small pieces of scrap iron and steel in a realistic manner by remote control. Pressing the button energizes the electromagnet and at the same time starts the motor which swings the boom. Releasing the button stops the motor and drops the load: To make the Crane move in the opposite direction, push the button twice and hold down.

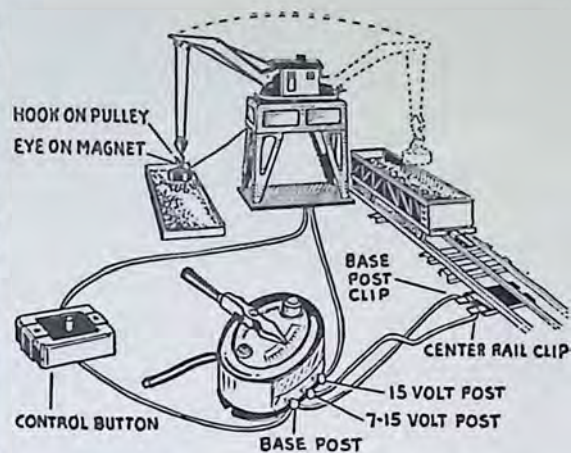


Fig. 29

See Fig. 29 for best arrangement of Crane in relation to track and hook up as shown.

The hand wheel at rear of cab raises or lowers the boom for placing magnet at proper height over load of scrap iron in tray.

The No. 596 Water Tank should be placed so that the spout can be lowered over the center of your train can then be brought into position for filling. The spout comes down when the button is pressed. The airplane beacon is lighted continuously.

The illustration (Fig. 30) shows the Water Tank wiring.

If you have a 4 or 5 post American Flyer Transformer connect the red and black wires to the 7-14 volt post.

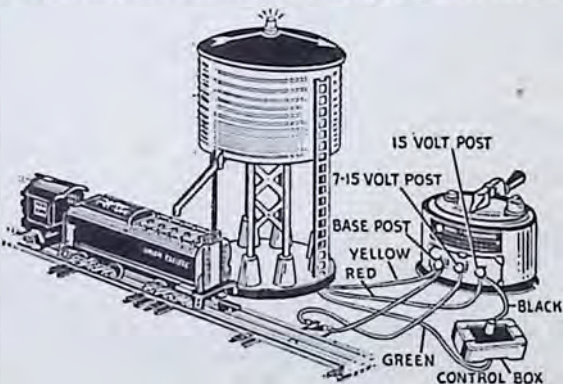


Fig. 30

The No. 472 Army Unloading Car is operated by Remote Control. When the car is stopped on the special track section and the button is pressed, the platform swings out and tilts and the tanks rolls off the car. The platform swings back automatically. Locate this unloading device so that the tank rolls toward you. Then it may be reached easily to replace on the car as it passes you the next time.

Place the special section of track in your layout as you would a regular straight section and connect as shown in Fig. 31.

If you have a 4 or 5 post American Flyer Transformer connect the short wire to the 7-14 volt post instead of to the 15 volt post.

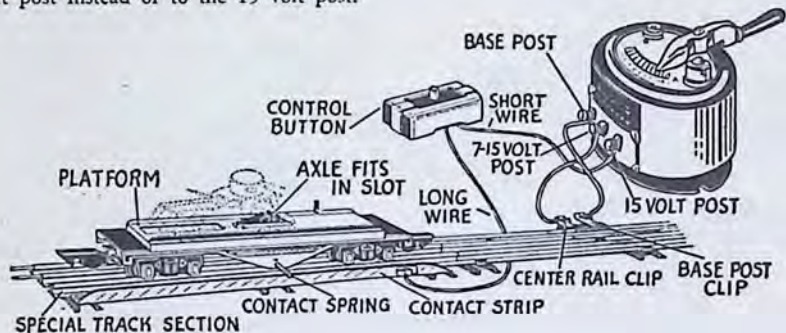


Fig. 31

The No. 474 Dump (Coal or Ballast) CAR will drop a load of coal or crushed stone beside the track by Remote Control. Stop the car on the special section of track and press the button (connected as in Fig. 32.) The door opens allowing the load to slide out. Place the pan where it will receive the material dropped from the car.

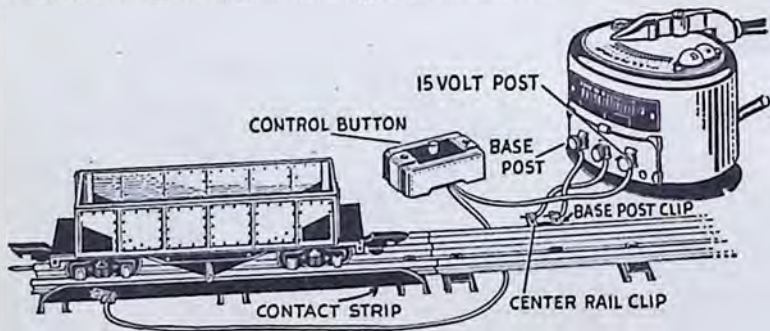


Fig. 32

The No. 492 Mail Pick-Up Car delivers and picks up sacks of mail by Remote Control without stopping the train. Hang one of the mail bags on the standard and as the train approaches the special section of track press the button and hold it down. When the train passes over the contact strip the pouch catcher on the car will swing out and pick up the bag.

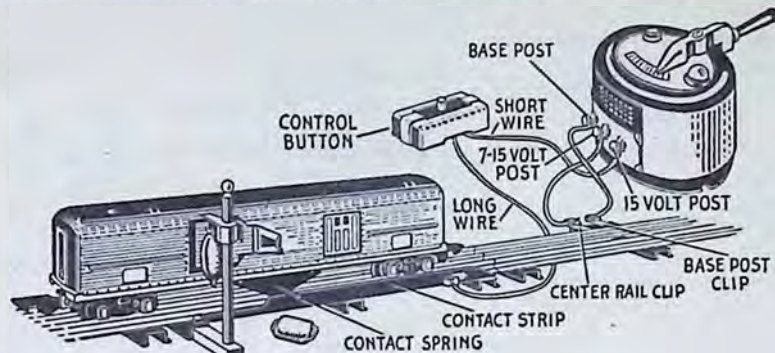


Fig. 33

After the train has passed release the button. Hang the other bag on the standard and repeat. This time the car will throw out the first sack and pick up the second.

Fig. 33 shows the proper hook-up for the Mail Pick-Up Car.

## ILLUMINATED EQUIPMENT

Illuminated accessories such as street lights, signal tower, stations, etc., are simply connected to a separate track terminal which is attached to the track wherever convenient.

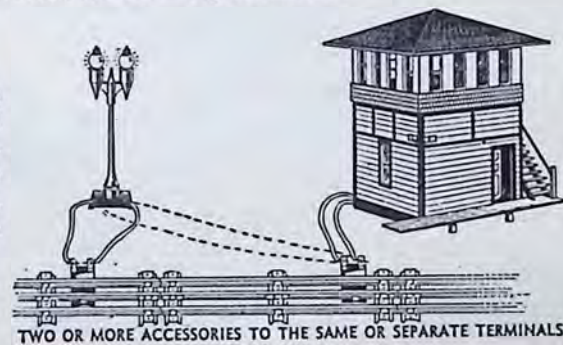
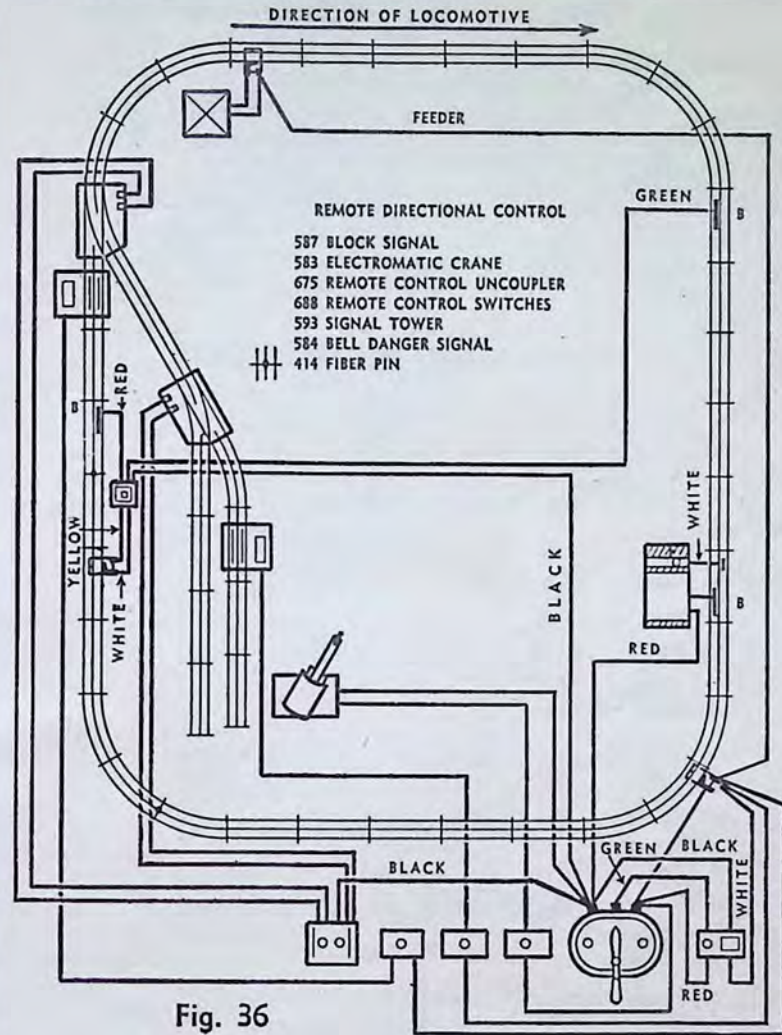
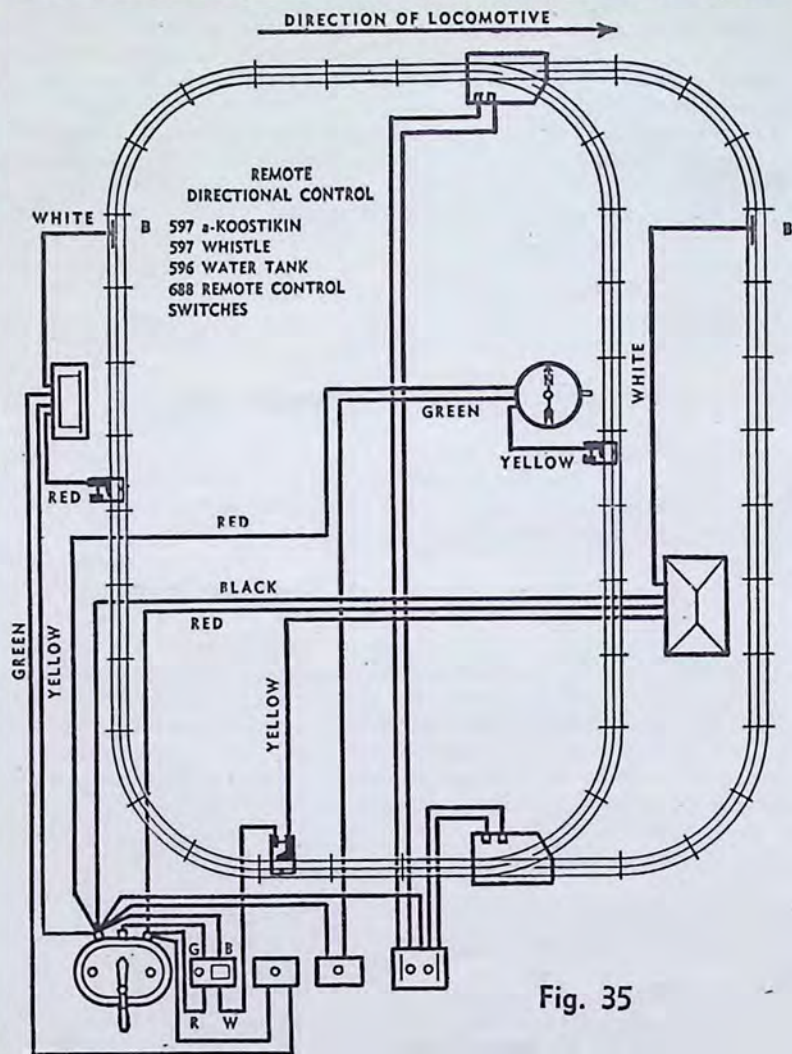


Fig. 34

# MULTIPLE CONNECTION DIAGRAMS SHOWING ELECTRICAL HOOK-UPS OF VARIOUS UNITS IN COMBINATION



## RAILROAD MAINTENANCE

### Little Tricks in Finding and Remedying Trouble

Maintenance of the right of way is of primary importance to the miniature railroader as it is to the vast railroads of the country. Following are suggestions that will aid you in keeping your railroad up to highest efficiency.

**TRACK.** After the track has been taken apart a few times, the openings in the rails become enlarged, causing the pins to fit loosely. To insure tight connections and proper electrical contacts, reduce the pin openings by slightly pinching the rail ends with pliers as shown in Fig. 37.

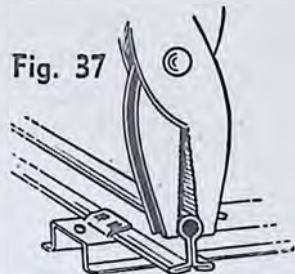


Fig. 37

### TO TEST AND REPAIR SHORTS

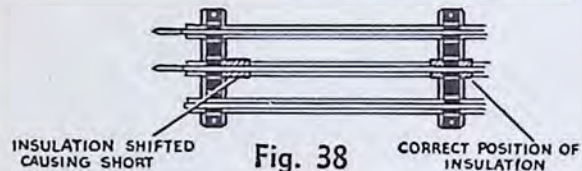


Fig. 38

Due to rough handling or excessive use, the insulation between the center rail and tie may shift so that a short circuit develops. See Fig. 38

The method of finding the shorted section is shown in Fig. 39

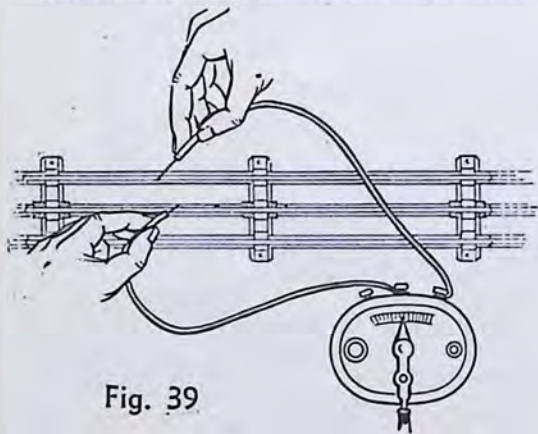


Fig. 39

Connect one lead wire to the Base Post of your transformer and another to the 7 to 15 volt post of the transformer. Set the control lever to the half way point and plug in your transformer.

Now hold the end of one wire to either outer rail and lightly touch the inner rail with the other lead wire. No spark should be seen between the lead wire and the inner rail if the track is properly insulated. Continue to test each separate piece of track. If any sections

are found shorted, that is, that cause a spark when tested, they should not be put back in your layout until repaired. By closely examining a shorted section of track you will discover that one or more of the clamps on a tie is touching the center rail. (See Fig. 38.) With a sharp screwdriver the clamp can be loosened and the insulating piece shifted so that the third rail is completely insulated from the ties. When you have completed the repair, retest the section. Now reassemble your layout and test it as a whole.

To test a switch for short circuit, set the switch for "Regular Operation." With one wire from the transformer held on an outer rail touch any center rail. If spark occurs look for a grounded center rail (see Fig. 38) and correct as described above.

If the train stops, on going over a switch, an open circuit is indicated. In this event, make sure the spring connector on the switch is making contact with the center rail of the adjacent track section. Also see that the flat metal spring, set in the roadbed just in back of this connector, is pressing upward against the end of the movable part of the switch.

To test a crossover for short circuit proceed as in Fig. 39 touching each of the center rail sections. If spark occurs correct as described above.

### KEEP TRACK FREE FROM OIL

Wipe the rails regularly with a clean rag to remove any oil or dirt that may have collected on them. This is important to insure a good electrical contact and to keep the drive wheels from slipping. The rails should be cleaned from time to time with a non-inflammable cleaning fluid on a cloth or with a piece of fine sand paper.

### LUBRICATION OF YOUR ROLLING STOCK

Your rolling stock, to be maintained at operating efficiency, must be kept well lubricated at all times. For most satisfactory performance your locomotive and car axles should be oiled every 4 hours of actual operation. Also before operating when you first get the train and after it has been put away for any length of time. It must be remembered that too much oil or oil in the wrong places is to be guarded against. A drop of oil is all that is necessary at any point; this is best attained by dipping a toothpick or a needle in a bottle of oil. Never use an oil can. Always use a high grade of sewing machine oil.

### POINTS TO LUBRICATE

Car Axles	Drive Wheel Bearings
Tender Truck Axles	Side Rod Bearings
Locomotive Truck Axles	Main Rod Bearings
Locomotive Motor Bearing	Valve Rod Linkage
Locomotive Driving Gears	Crosshead Guides

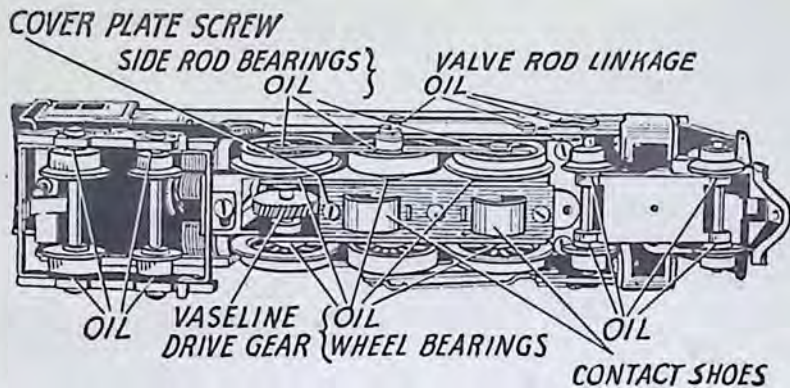


Fig. 40

After oiling, run trains around track a few times and then wipe the rails to remove any oil which might have run down on them.

### POINTS TO KEEP FREE FROM OIL

Surface of Rails	Commutator and Armature
Rims of Locomotive Wheels	Brushes
Rims of Car Wheels	Contact Shoes

### TESTING A LOCOMOTIVE

If a locomotive refuses to run, first see that current is being supplied to it at the proper voltage. To be sure that there is power in your track, hold a screwdriver blade on an outer rail and lightly touch the end of the screwdriver to the center rail. A spark should be seen. If no spark is evident there is something wrong with your power supply. Make sure of your connections and that the lever on your transformer is not in the "stop" position. Check on your house current, try a bridge lamp in the socket where you have plugged in your transformer.

If a spark is evident at the rails be sure that the Contact Shoes, shown in Fig. 40, make contact with the center rail and that all the wheels are in place on the rails.

If power is being picked up by your locomotive the headlight will light. Considering that this is the case and still your locomotive will not run, turn your transformer lever off then on or press Directional Control Button. If the locomotive does not start the hold-down lever on a Standard Remote Control Unit may be locked in the neutral position, if so, release it and try again. If yours is a locomotive with Directional Remote Control you will find a small hole in the top of the Locomotive Boiler. By pushing a pin down through this hole you will be able to move the control out of the neutral position.

If the motor still does not turn over look for loose or broken connections in the locomotive. Examine the brushes to see that they are not worn out and that they make good contact with the commutator.

If the wheels move, but slowly and a higher voltage than is customary is required, simply cleaning and lubricating the motor may be all that is necessary.

A dirty commutator will also slow down the motor and will cause the brushes to wear out faster. To clean the commutator (Fig. 41) turn the locomotive on its back, remove the rear truck and fasten lead wires to the contact shoe and the motor frame. While the motor is running, press a piece of very fine sandpaper ("00" or finer) against the commutator. Press lightly until the whole surface of the commutator is smooth and bright. Then stop the motor and with a pointed tool, such as a needle, clean out the slots between the segments of the commutator. It is essential that the copper dust from worn brushes or commutator be thoroughly cleaned from the slots between the segments.

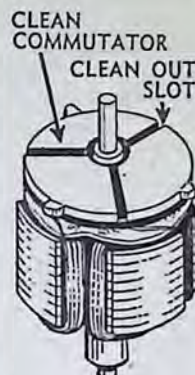


Fig. 41

### LAMP DATA

#### HEADLIGHT REPLACEMENT.

##### STEAM TYPE LOCOMOTIVES

Remove the boiler front held by spring clips.

##### STREAMLINE LOCOMOTIVES

Turn locomotive on its back and pull out the lamp bracket, which is held by spring tension.

##### CARS

**DIE CAST.** Remove screw holding lamp bracket on bottom of car.

**PRESSED STEEL.** With thumb and first finger on the two wings at the edge of the lamp bracket, turn counter clockwise.

#### ACCESSORIES

**Blinker and Block Signal.** Remove screws in base and lift off the top of signal. Slip lamp bracket off base.

**TRACK SWITCHES.** Remove screws from lamp housing.

#### LAMPS ARE USED AS FOLLOWS:

No. 440 in all Locomotives and Cars, all Stations and Accessories except No. 579 and 580. No. 451 — in No. 579 and No. 580 Lamp Posts. No. 441 — where red globes are required. No. 443 — when green globes are required. No. 452 in No. 588 Semaphores.

No.	Volts	Glass	Color	Diam.	Lamps in Pkg.
440	14	Round	Clear	7/16"	3
441	14	Round	Red	5/8"	3
443	14	Round	Green	5/8"	3
451	14	Round	Frosted	5/8"	1
452	14	Min. Round	Clear	5/16"	1

## DO'S

- DO — Read carefully the instruction sheets packed with each train and item of equipment.
- DO — Oil locomotive bearings frequently.
- DO — Wipe the tracks frequently with a non-inflammable cleaning fluid and fine sand paper.
- DO — Make sure track layout is level.
- DO — Run an additional wire or "feeder" from the 7-15 volt post of the Transformer to a point in the center rail farthest from the transformer. This prevents the slowing down of trains due to track resistance.
- DO — Attach the track terminal in a section which will not become dead if between two Remote Control Switches.
- DO — Be sure the spring connector on the track switch makes good contact with the center rail of the adjacent track section.
- DO — Set the Remote Control Switches for "regular operation" unless a dead siding is desired.
- DO — See that the metal strip of the track trip does not touch the rail.
- DO — Be sure the coupler on the last car does not touch the center rail.
- DO — Remove transformer plug from outlet when through operating your train.

If any locomotive, car or piece of equipment is to be returned to the factory, be sure it is carefully packed and protected on all sides, front and ends. Include on outside of package your name and home address (Street or R. F. D. No., City and State) and glue or paste letter of explanation, in a separate envelope, on the outside of package. Put correct amount of parcel post stamps on package and first class postage on envelope. Be sure your name and address are clearly written in your letter.

## DON'T'S

- DON'T — Put too much oil on your locomotive.
- DON'T — Put oil on Commutator.
- DON'T — Put oil on brushes.
- DON'T — Overload the locomotive by adding too many cars or too much weight in cars.
- DON'T — Take locomotive apart.
- DON'T — Get sand or dirt into locomotive.
- DON'T — Store train in damp places.
- DON'T — Get water in or on trains or track.
- DON'T — Step on the track.
- DON'T — Bend, distort or force track.
- DON'T — Drop pieces of metal or Christmas Tree Tinsel across the track, as it causes shorts.
- DON'T — Place locomotive or cars on track while current is turned on.
- DON'T — Hold Directional Control buttons down any longer than necessary to get desired results. This avoids burn-outs.
- DON'T — Run trains at full speed around curves.
- DON'T — Use a transformer of less wattage than recommended in our catalog.
- DON'T — Attempt to use 110 volt current without a Transformer.
- DON'T — Plug your transformer into Direct Current or any current not specified on the transformer.
- DON'T — Take Transformer apart.
- DON'T — Connect equipment or lamps to a higher voltage than specified in the directions.

## QUESTIONS AND ANSWERS

Q. How much current or how many amperes does my train draw?

A. The amount of current or amperes drawn depends largely upon the number of cars or load the engine is required to pull. However, it is within the limitations of 2 to 2½ amperes. This statement also applies to equipment. Naturally the more equipment added, the more amperes you need. The larger the transformer you have, as to wattage, the more trains and equipment can be operated.

Q. Can Directional Remote Control locomotives be operated on Direct Current?

A. No. If you have 105-115 volt Direct Current, by securing a No. 10 D.C. Inverter you can change Direct Current to Alternating Current and then all Directional Remote Control Locomotives will operate.

Q. Must a transformer be used with a No. 10 D.C. Inverter?

A. Yes.

Q. Can I use a 9B or 12B Transformer with a No. 10 D.C. Inverter?

A. No. Do not use a Transformer with an output of over 100 watts.

Q. Will Directional Remote Control locomotives operate on 25 cycles?

A. No.

Q. What equipment will operate on 25 cycle and what will not?

A. All equipment will operate on 25 cycle current with a 25 cycle Transformer except the a-Koostikin, Whistling Express Car and trains equipped with Directional Remote Control motors.

Q. Is it hard to install the No. 676 Couplers?

A. Unless you have had some mechanical experience do not attempt this change as it requires drilling, removing a rivet and the replacement of that rivet.

Q. Can the No. 676 Couplers be used on other cars than American Flyer?

A. See answer to above question.

Q. How can I operate an a-Koostikin without the train stopping each time?

A. By installing a cutout switch to open the circuit to the station or put the trip that operates the a-Koostikin on a siding.

Q. Can the Block Signal be hooked up with any American Flyer Train?

A. Yes.

Q. What equipment will operate on D.C. and what will not?

A. All equipment will operate on D.C. if a No. 10 D.C. Inverter and the proper transformer are used.

## QUESTIONS AND ANSWERS

Q. How steep a grade will "O" gauge locomotives climb?

A. We recommend avoiding grades of any kind. Remember to keep your track layout on a level for best performance.

Q. Will American Flyer "O" Gauge Trains operate on track other than American Flyer Track?

A. Yes. American Flyer Trains will operate on any "O" gauge toy train track of 40" diameter or greater.

Q. Will the wheels on American Flyer Trains run on "O" Gauge Model Builders Scale Track?

A. No.

Q. What is the difference between Gauge and Scale?

A. Gauge is the distance between the inside edges of the running rails. Scale is the measure used in duplicating locomotives, cars and equipment in miniature in relation to the life-size models so imitated.

Q. What is the difference between "O" and "HO" Gauge track?

A. "O" Gauge is 1¼" between the outside rails. "HO" Gauge is 16½ mm. which is slightly larger than ⅝" between the rails.

Q. What does 3/16" scale mean?

A. 3/16" scale is 3/16" to 1 foot of the life size locomotive, tender, cars, or equipment. American Flyer 3/16" scale trains will operate on "O" gauge track.

Q. What do the numbers 4-6-4 and similar combinations mean?

A. This indicates the wheel arrangement of the locomotive. The first figure indicates the number of pilot wheels or pony truck wheels. The second figure is the number of drivers and the third figure the number of trailing truck wheels or booster truck wheels.

Q. What is the cause of arcing or sparking?

A. 1. Commutator sparking. A small spark does no harm. Keep running the locomotive and it will disappear to a minimum which is necessary. Commutator sparking can also be caused by loose or worn out brushes. Tighten brushes or buy new brushes. See that commutator is not grounded to any part of the locomotive.

2. Contact shoe sparking. Keep contact shoe and center rail clean by wiping or with fine sand paper. If contact shoe is worn, this will cause sparking and it then should be replaced. Be sure the shoe exerts a slight pressure on the center rail.

3. Sparking at wheels. This is generally caused by non-clean wheels or where track is not put together properly. Clean wheels and track with fine sand paper. Test all track connections.

# ★ RAILROAD LINGO ★

Battleship	<i>Large Locomotive</i>	Highball Artist	<i>Engineer noted for fast running</i>
Bend the Iron or Bend the Rail	<i>Change the position of a switch</i>	High Iron, Main Iron or Main Stem	<i>Main line track</i>
Big Hook	<i>Wrecking Crane</i>	Highliner	<i>Main line passenger express train</i>
Black Snake	<i>Train of coal cars</i>	Hit the dirt	<i>To jump or fall off moving train</i>
Brass Pounder, Lightning Slinger or Op. Telegraph Operator		Hog, Pig, Smoker	<i>Locomotive</i>
Captain, Brains or Skipper	<i>Conductor</i>	Hole	<i>Siding into which train pulls to let another pass</i>
Cinder Cruncher, Dolly Flapper or Snake Switchman		Hot Shot	<i>Fast passenger or freight train</i>
Club Winder, Ground Hog or Shack	<i>Brakeman</i>	King	<i>Freight conductor or yardmaster</i>
Clown Wagon, Crummy, Dog-House, Hack, Monkey House, Shanty	<i>Caboose</i>	Liner	<i>Passenger Train</i>
Cornfield Meet	<i>Head-on collision between two trains on same main track</i>	Mtys	<i>Empty cars</i>
Cut	<i>Several cars coupled together or attached to engine</i>	Paddle	<i>Semaphore signal</i>
Detainer	<i>Train Dispatcher</i>	Peddler	<i>Local Freight</i>
Diamond	<i>Track crossover</i>	Pike	<i>Railroad system</i>
Dinger	<i>Yardmaster</i>	Plug	<i>Locomotive throttle</i>
Drag	<i>A slow freight train</i>	Pound Her	<i>Work locomotive to capacity</i>
Eagle Eye, Hogger, Hoghead, Pig Mauler or Whistle Pig	<i>Engineer</i>	Rattler	<i>Freight Train</i>
Flimsy	<i>Written train order</i>	Red Ball	<i>Fast Freight</i>
Garden	<i>Freight yard</i>	Shuffle the Deck	<i>To switch cars on house tracks at every station</i>
Gate	<i>Switch</i>	String	<i>Several cars coupled together</i>
Glory	<i>String of empty cars</i>	Tank	<i>Locomotive tender</i>
Gon	<i>Gondola car</i>	Varnish	<i>Passenger cars or train</i>
Highball	<i>Signal for clear track, mean- ing go ahead at high speed</i>	Washout	<i>Quick stop signal</i>
		Whale Belly	<i>Steel coal car</i>
		Wheel	<i>To drive locomotive at high speed</i>