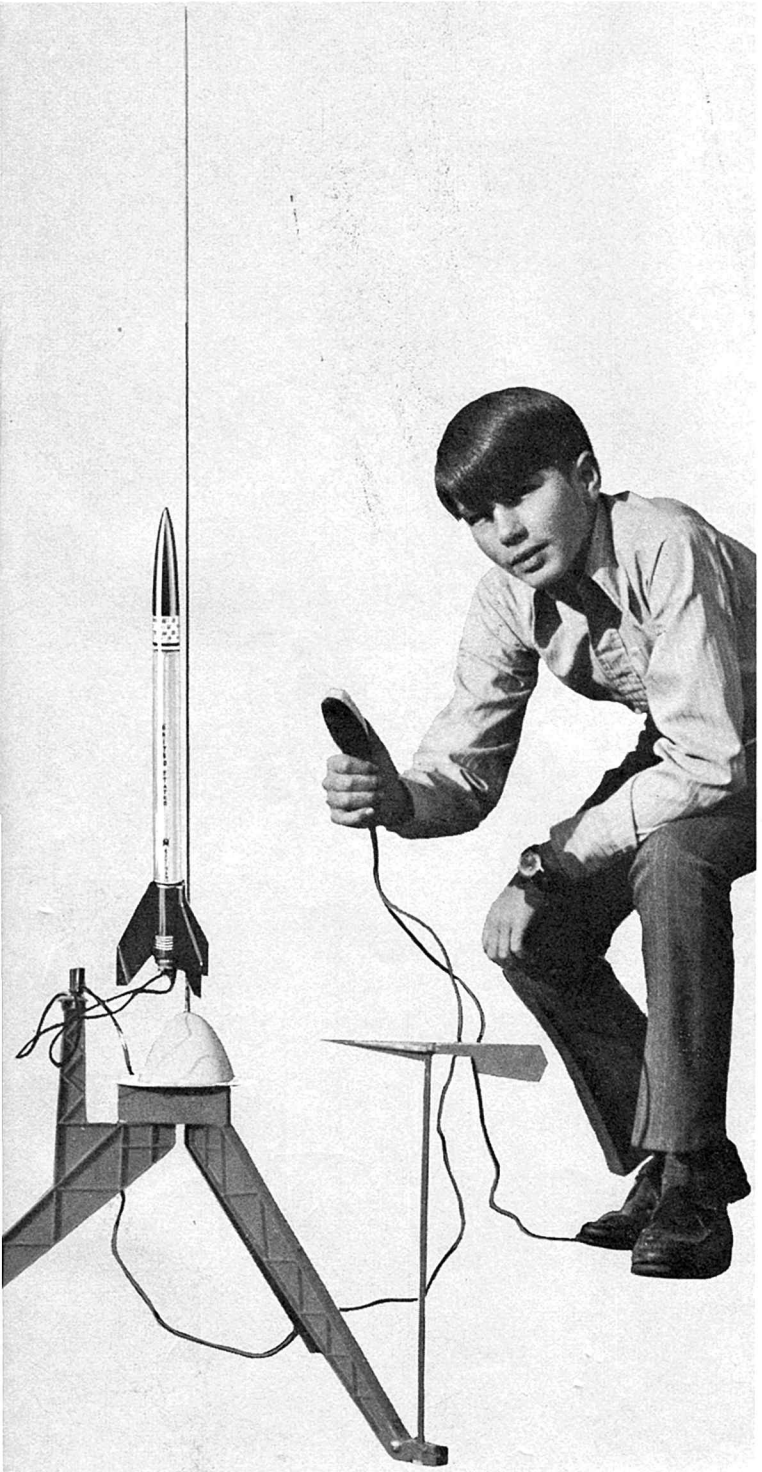
MODEL PRODUCTS
126 GROESBECK HIGHWAY
MOUNT CLEMENS, MICHIGAN 48043

FLYING MODEL ROCKET OUTFIT



Our generation has seen man begin his journey to the planets, and beyond. Already man has traveled to the moon, and plans to colonize it with a scientific community. Every mission brings these dreams closer to reality.

You may well participate in this thrilling adventure through model rocketry. Your MPC MODEL ROCKET OUTFIT includes all the components necessary for your own exciting launchings. This set was inspired by the scientific and technological advances being made today by the thousands of members who make up the nation's aero-space team. MPC has developed a model rocket program to meet the requirements of the ever expanding number of responsible youth and adults engaged in this most thrilling hobby.

You may prepare for, and control the launching and recovery of your rocket with much of the realism of an actual flight. As your model rocket sits poised on its launch platform, with your LAUNCH CONTROL in your hand, you begin the countdown. At T-O, a press of the button sends your rocket streaking into the sky under power of its own solid propellant engine. After burn-out the rocket coasts a few seconds to peak altitude, hundreds of feet in the air, and a recovery device deploys for a soft landing.

Schools throughout the country have endorsed model rocketry as an exciting, educational resource, bringing to the student, first hand the principals associated with aero-space flight.

Model rocketry is a hobby that can be enjoyed by the whole family. The following step by step instructions for the assembly of your model rocket kit and launch complex provide a clear and fresh approach to the captivating hobby you are now a part of.

This model rocket has been designed and developed to give you a straight high flight if the instructions are followed carefully. The exciting and educational sport of model rocketry has grown into a full scale national activity, and will continue to grow every time you fly your rocket safely. Formation of a rocket club in your area will provide you with hours of enjoyment even when you're not flying rockets. Look for our new models appearing on your dealer's shelves soon.

WHAT IS MODEL ROCKETRY?

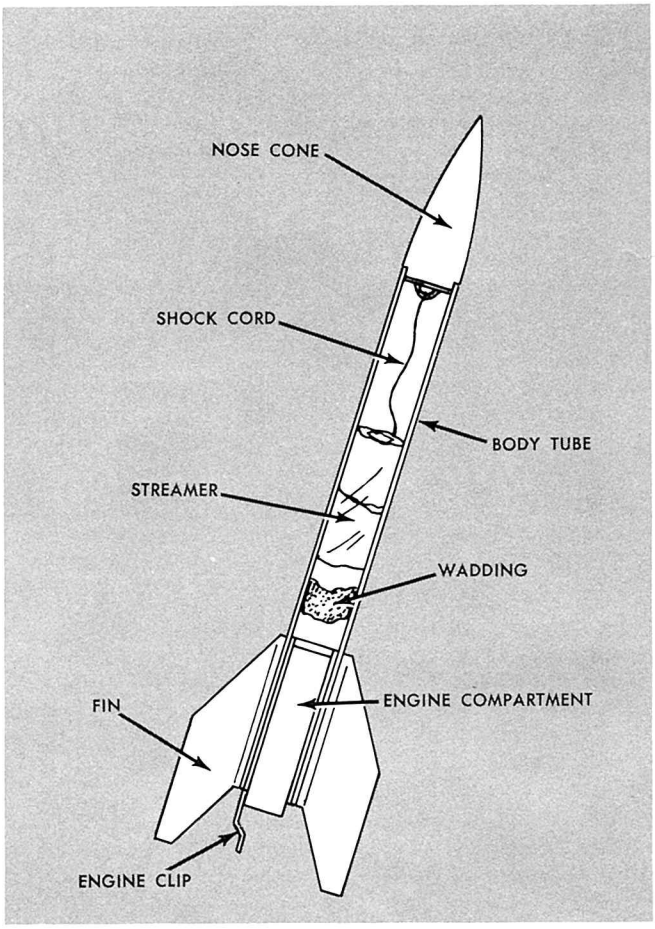
Model Rocketry is an international aerospace sport, a space age educational tool, a technological recreation, a hobby. It is recognized as such by many organizations: NASA, U.S. Air Force, the National Fire Protection Association, National Science Teacher's Association, American Institute of Aeronautics and Astronautics, National Aeronautic Association, the 51-Nation Federal Aeronautique Internationale, and various U.S. Government agencies.

WHEN DID MODEL ROCKETRY START?

Model Rocketry was born with the space age in 1957. Since that time, nearly 15,000,000 model rockets have been flown in the United States. 1957 also saw the start of the National Association of Rocketry (NAR), a non-profit organization formed for the purpose of guiding and encouraging the healthy growth of model rocketry as a hobby-sport throughout the United States.

WHAT IS A MODEL ROCKET?

Model Rockets are made of paper, balsa wood, plastic and other materials having high strength and low weight. Most model rockets weigh only a very few ounces. They use a factory-loaded, pre-packaged solid propellant rocket engine of high reliability. There is no handling or mixing of chemicals or explosives.

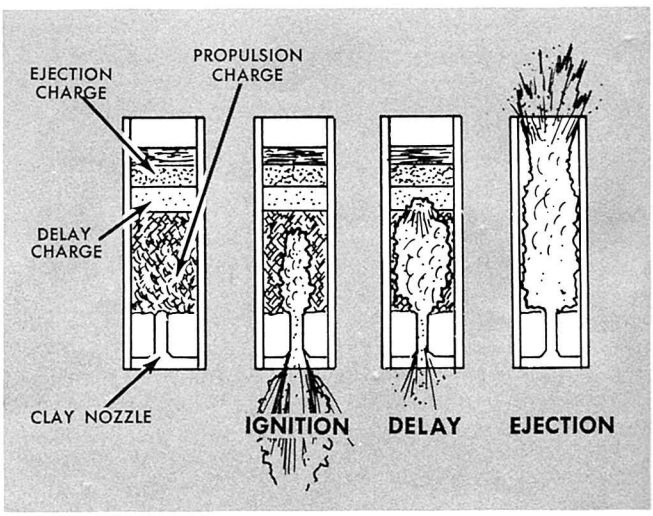


HOW DO MODEL ROCKETS OPERATE?

Model Rockets are launched electrically and soar to altitudes ranging from one hundred to over a thousand feet. After the rocket has reached its highest altitude, a recovery device is deployed which will lower it gently and safely to the ground so it can be used over and over again by installing a new rocket engine.

HOW DO ENGINES OPERATE?

The rocket engine is ignited electrically. An electrical current passes through the igniter to the solid propellant, creating gas pressure inside the engine. These gases, passing through the rocket nozzle, lift the rocket off the launching pad propelling it upward into a flight path. After the propellant has been expended, a delay charge is ignited, allowing the rocket to coast to its highest point. Following this, an ejection charge is ignited, forcing pressure forward. This pressure blows off the nose cone and deploys the recovery device.



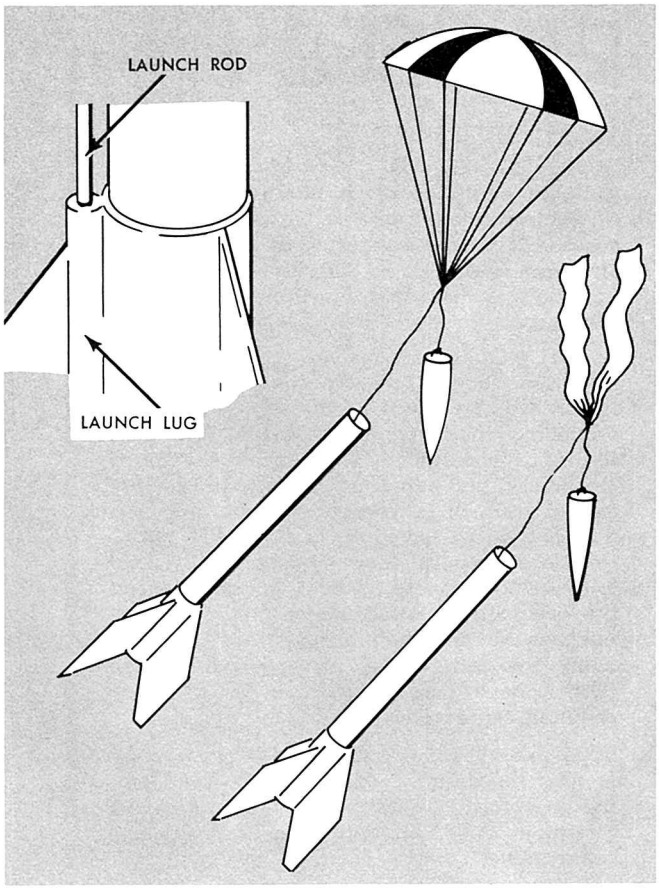
FLIGHT AND RECOVERY

The engine of a model rocket is only the propulsion unit, and although it plays a small part in the stability of a rocket, it is not the main factor. Flight stability must be achieved for proper performance of your rocket.

The launch rod and launch lug are two extremely important parts needed for stable flight. The launch rod guides the rocket during the first few moments of flight and is the rockets guidance system until sufficient speed has been obtained for the fins to come into effect. By the time the rocket has left the launch rod it has reached enough speed for the fins to take over guidance. The launch lug must be fastened securely to the rocket for this to be accomplished.

The length of the rocket in relation to the weight and size of the fins, are factors that determine stable flight. All MPC model rockets have been designed with this in mind, so you will always have a good, straight flight.

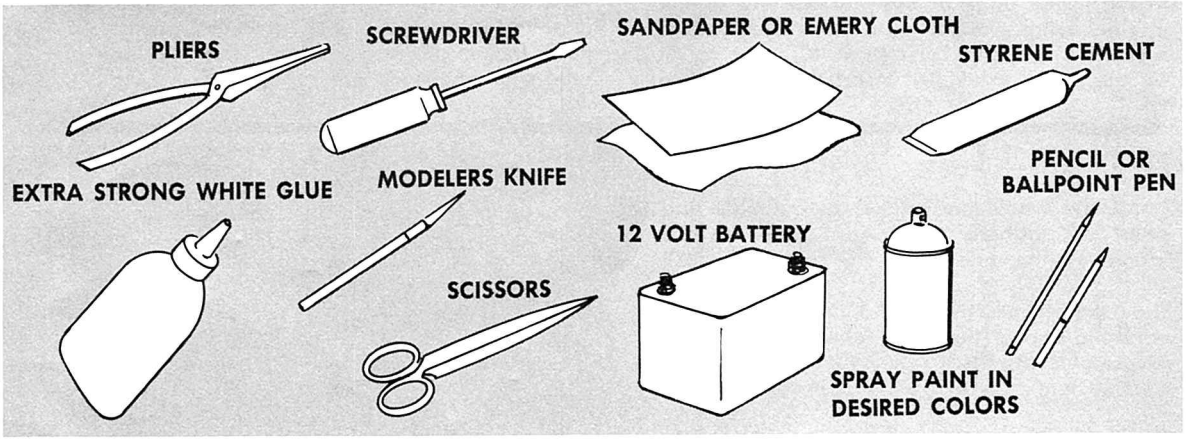
The recovery system of your PIONEER I is a streamer. This is the simplest and most reliable way of lowering a rocket safely to the ground. For larger and heavier rockets a parachute is used. The streamer or parachute should never be jammed into the rocket so that they cannot eject upon engine burn-out.



HOW SAFE IS MODEL ROCKETRY?

When common sense codes are followed, model rocketry has proven itself to be as safe as any other hobby and actually safer than Little League Baseball, model airplanes and swimming. It is so safe that the Insurance Company of North America provides public liability and property damage insurance in the amount of $3,000,000 to all members of the National Association of Rocketry (NAR) including minors. Since the insurance program started in 1964, there have been no claims paid against this INA insurance policy.

ITEMS REQUIRED FOR BUILDING AND FLYING



PIONEER 1

WARNING!

(MODEL ROCKET)
A flying model rocket is a scientifically designed educational model . . . NOT A TOY! If misused it can be dangerous. It is capable of attaining speeds up to 300 mph. It should be used only as instructed, and treated with care and respect.

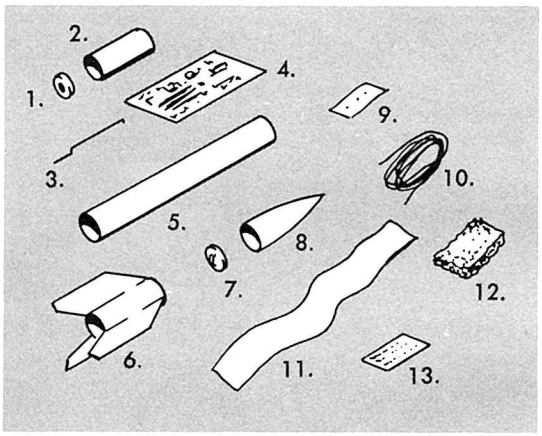
(MODEL ROCKET ENGINES)
Solid propellant Rocket Reaction Engines are specifically designed for the sole purpose of propelling model rocket vehicles. They are scientifically designed, produced on automatic machinery, and subjected to statistical quality control tests. It is very important, however, that caution be exercised in their use. All instructions must be read thoroughly first and followed completely. Model rocket engines are designed for one purpose only. They are not toys — and their misuse must be absolutely avoided. Model rocketry has proven itself to be as safe as any other hobby, when common sense codes are used.

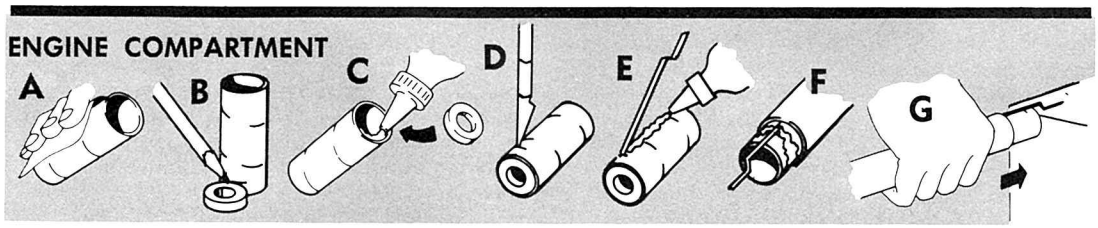
Build this kit only as shown. Do not attempt to alter the design in any way. Each kit was designed to give maximum stability, and any alteration or variation of the rocket design could make it unsafe.

Before you begin building, look over the instructions carefully. Following the procedure given, test fit the parts without gluing. This way you will be more familiar with the location of parts when it becomes time to use glue. The parts list will acquaint you with the pieces in the kit.

PARTS LIST

1. ENGINE BLOCK
2. ENGINE COMPARTMENT
3. ENGINE CLIP
4. DECAL
5. BODY TUBE
6. PLASTIC FIN
7. NOSE CONE PLUG
8. NOSE CONE
9. SHOCK MOUNT
10. SHOCK CORD
11. STREAMER
12. WADDING
13. ADDRESS LABEL



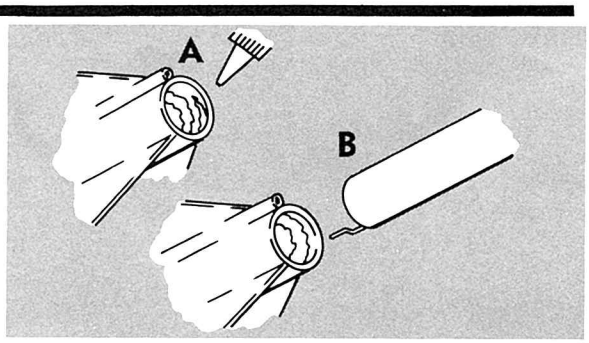


Sand the engine compartment so that it fits into the body tube easily (A). Put the engine block against the engine compartment and mark with a pencil, as shown (B). Apply glue to the inside edge of the marked end of the engine compartment, and insert the engine block, so the ends are flush (C). Cut a slit on the pencil mark (D). Insert the engine clip into the slit, as shown and glue in place (E). Insert this assembly about halfway into the body tube, so that the engine clip is sticking out. Apply glue all around the engine compartment (F). Now place this assembly against a solid object, and with constant pressure, push the engine compartment into the body tube until the ends are flush (G).

FINS

Sand the whole body tube so that glue and paint will adhere to it. Apply glue to the inside of the one piece fin assembly (A).

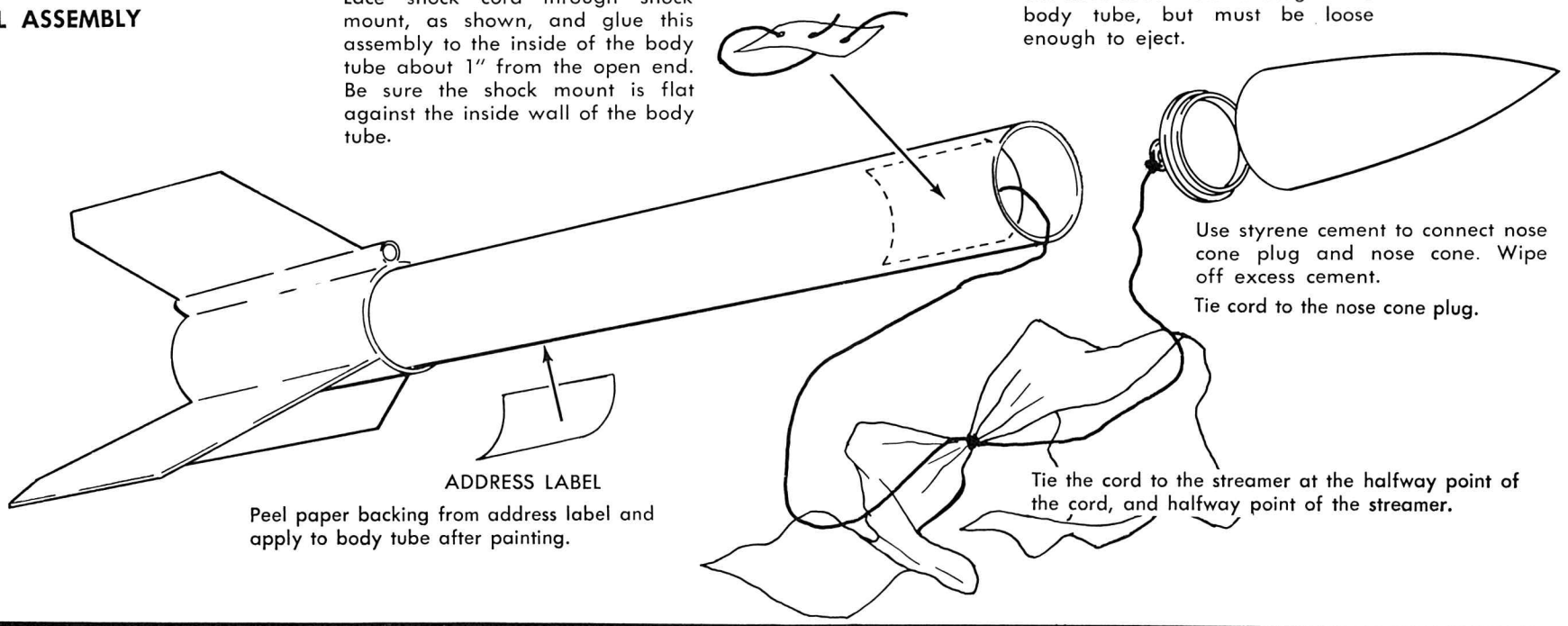
Slide the fin assembly onto the engine compartment end of the body tube, and wipe off excess glue (B).



FINAL ASSEMBLY

Lace shock cord through shock mount, as shown, and glue this assembly to the inside of the body tube about 1" from the open end. Be sure the shock mount is flat against the inside wall of the body tube.

The nose cone must fit snug in the body tube, but must be loose enough to eject.



Use styrene cement to connect nose cone plug and nose cone. Wipe off excess cement.

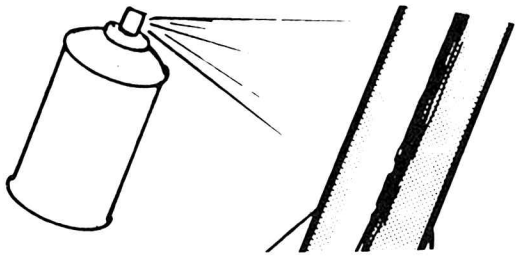
Tie cord to the nose cone plug.

ADDRESS LABEL

Peel paper backing from address label and apply to body tube after painting.

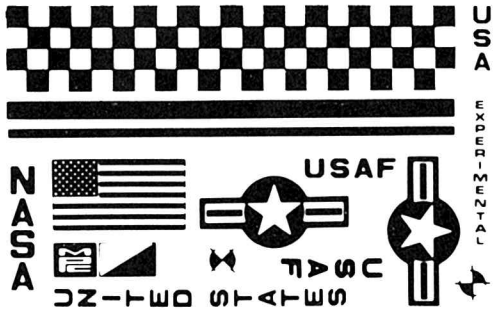
Tie the cord to the streamer at the halfway point of the cord, and halfway point of the streamer.

PAINTING



For best flight performance, and appearance, your rocket should have a smooth, hard finish. The cardboard should have several coats of sealer, sanding lightly between each coat. When painting, if a brush is used, sand carefully after each coat. If a spray can is used, apply several light coats avoiding runs.

DECALS



Before applying decals decide where you want them. To apply decals, cut them apart individually, close to the designs. Now dip them in water for a few minutes. Next slide it off the paper as you apply them to your rocket. Before the decals dry, smooth out any bubbles with a damp cloth.

ENGINE SELECTION

For your first flights with the PIONEER I we recommend the A3-2. After you have become acquainted with model rocket flight you may use the B3-3 or C6-4 engines. You can expect these altitudes:

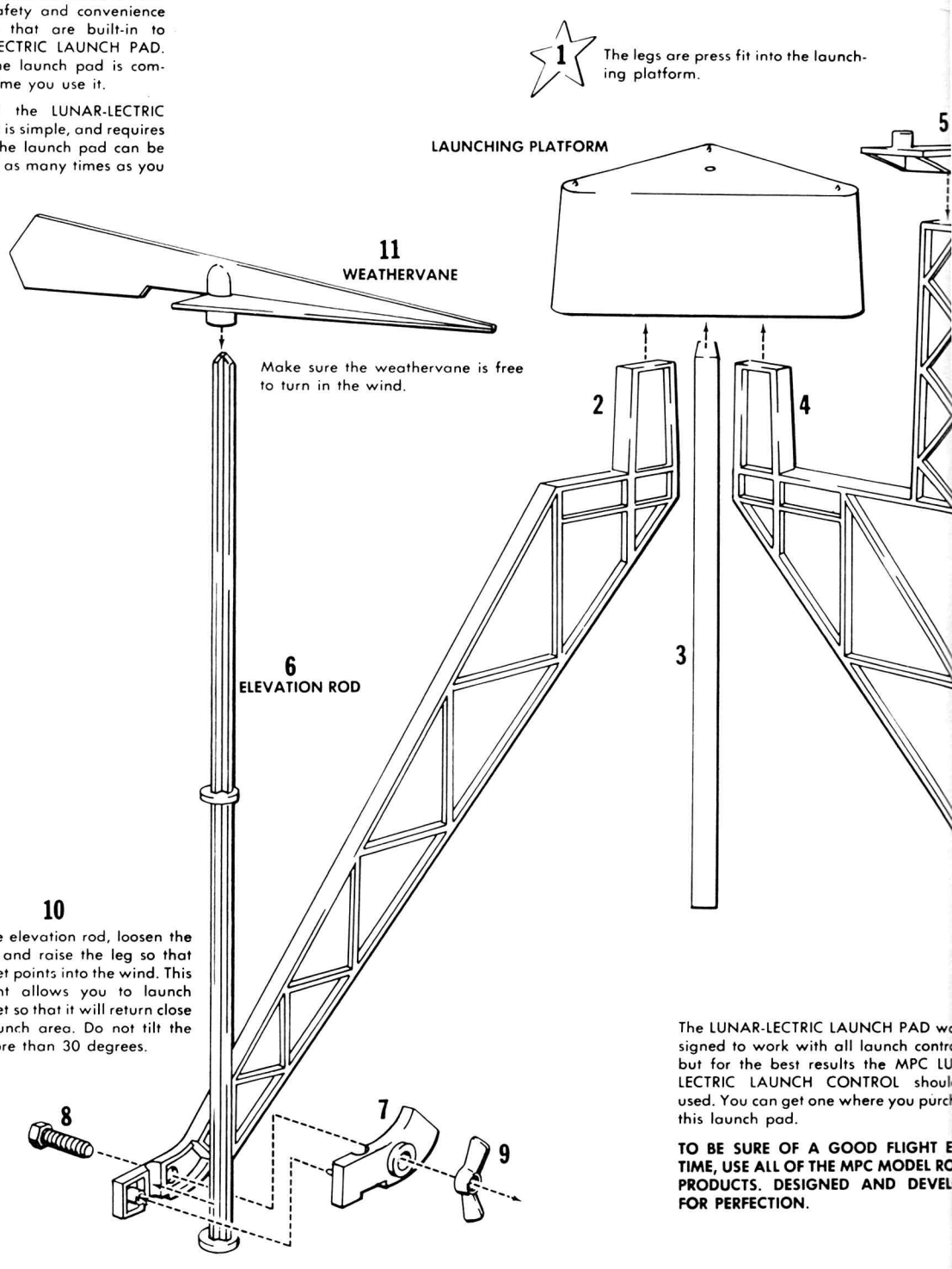
A3-2— 390 ft.
B3-3— 820 ft.
C6-4—1420 ft.

LAUNCH PAD

The LUNAR-LECTRIC LAUNCH PAD is not only an efficient launch pad, but is extremely technical in appearance. It was designed for ease of construction, and so that it can be disassembled for storage. Every situation has been thought of: from elevation, to wind direction, to blast deflection. Safety and convenience are features that are built-in to the LUNAR-LECTRIC LAUNCH PAD. Make sure the launch pad is complete every time you use it.

Assembly of the LUNAR-LECTRIC LAUNCH PAD is simple, and requires only pliers. The launch pad can be disassembled as many times as you like.

WARNING: Do not stand closer than 12 feet to launch pad when launching.



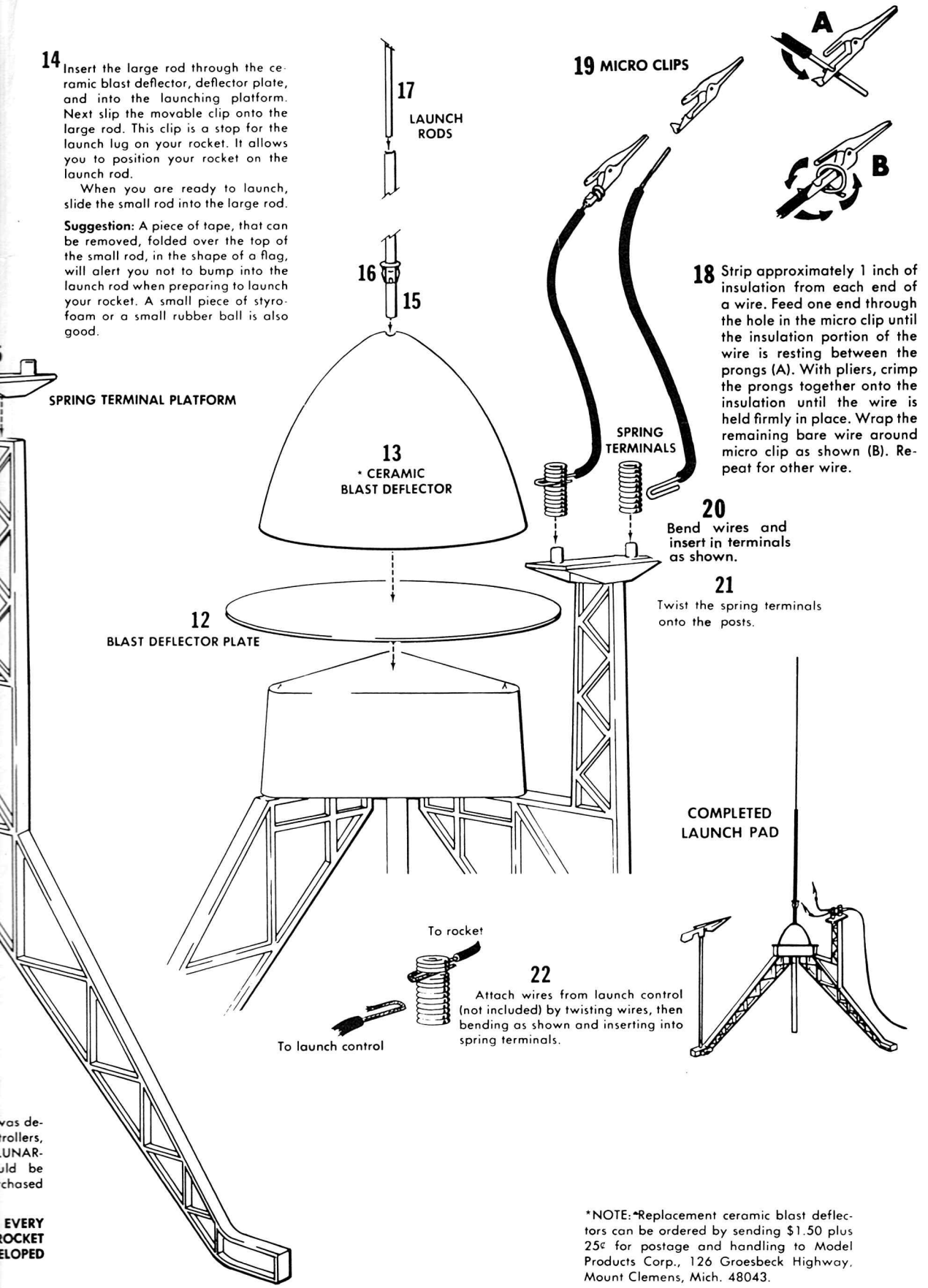
The LUNAR-LECTRIC LAUNCH PAD wa
signed to work with all launch contro
but for the best results the MPC LU
LECTRIC LAUNCH CONTROL shoul
used. You can get one where you purch
this launch pad.

**TO BE SURE OF A GOOD FLIGHT E
TIME, USE ALL OF THE MPC MODEL RO
PRODUCTS. DESIGNED AND DEVEL
FOR PERFECTION.**

14 Insert the large rod through the ceramic blast deflector, deflector plate, and into the launching platform. Next slip the movable clip onto the large rod. This clip is a stop for the launch lug on your rocket. It allows you to position your rocket on the launch rod.

When you are ready to launch, slide the small rod into the large rod.

Suggestion: A piece of tape, that can be removed, folded over the top of the small rod, in the shape of a flag, will alert you not to bump into the launch rod when preparing to launch your rocket. A small piece of styrofoam or a small rubber ball is also good.

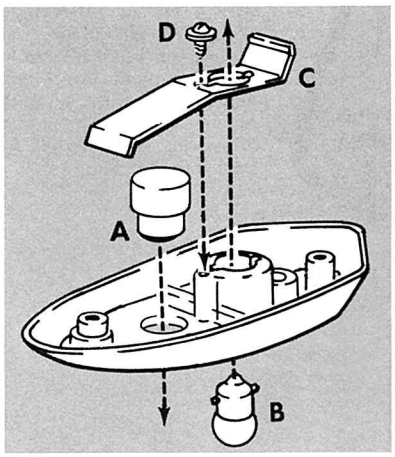


*NOTE: Replacement ceramic blast deflectors can be ordered by sending $1.50 plus 25¢ for postage and handling to Model Products Corp., 126 Groesbeck Highway, Mount Clemens, Mich. 48043.

LAUNCH CONTROLLER

The MPC LAUNCH CONTROLLER insures that electrical current from a dry cell, or storage battery is transferred to the igniter wires on your rocket. This is done on your command simply by inserting the safety key, and turning ¼ turn for a circuit check. Then press the ignition button for a perfect launch.

1. All small accessory parts for the LAUNCH CONTROL, and LAUNCH PAD are in the small plastic bag. From these parts select the small screw with washer, brass contact strip, and light bulb.



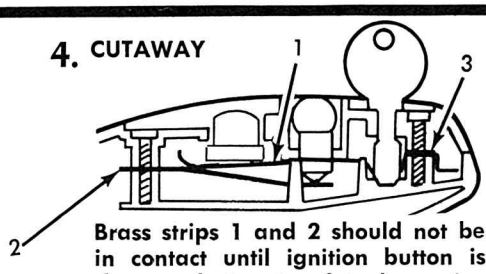
2. Turn the top of the LAUNCH CONTROL upsidedown, and insert the ignition button (A). Push the bulb through the hole (B). Locate brass contact strip over the bulb, give the bulb a 1/4 turn to lock it in place (C). Insert screw through contact strip and tighten (D).

3. You have a 9" piece of single strand wire between the contact strips. Loop this 9" piece three times around the boss, inside the LAUNCH CONTROL handle (A). Press wire retainer onto boss (B). Put contact strips in place on screw posts (C). Put top of LAUNCH CONTROL in place, and secure with screws (D).

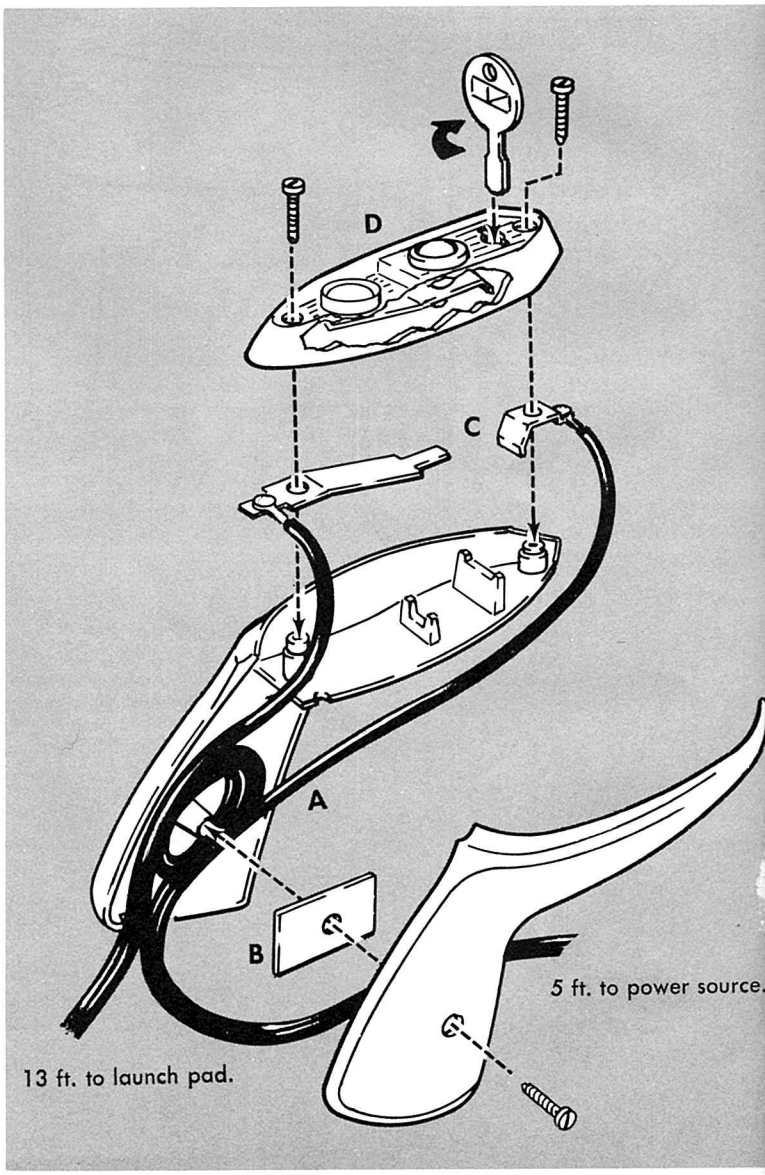
NOW A VISUAL CHECK OF PARTS CAN BE MADE, SEE CUTAWAY.

5. Once the check has been made, loosen screws on LAUNCH CONTROL top. Locate right half of LAUNCH CONTROL to left half, and secure handle screw (E). Tighten remaining screws.

4. CUTAWAY

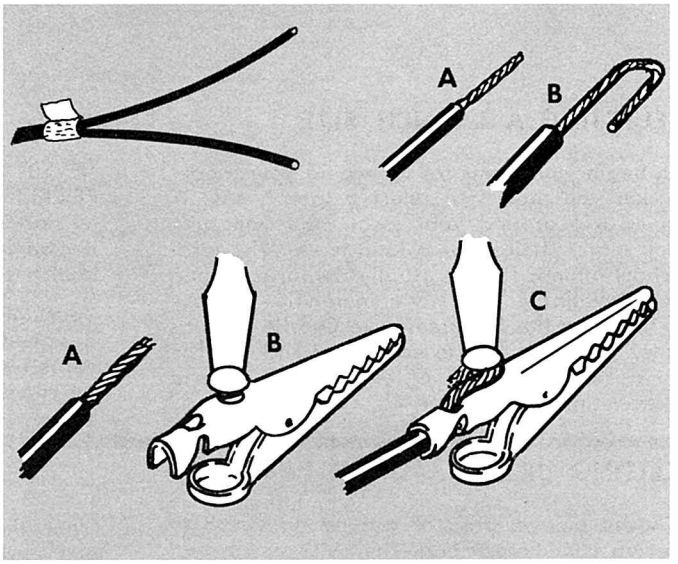


Brass strips 1 and 2 should not be in contact until ignition button is depressed. Insert safety key, give it a ¼ turn. Brass strips 1 and 3 should make contact with safety key.



6. The 13′ section of the wire coming from the LAUNCH CONTROL will go to the LAUNCH PAD. Separate the two strands of this wire 3″. Strip 1″ of the insulation off these wires. Twist the bare ends (A). Bend the wires into a U shape (B).

7. The 5′ section of wire will go to the power source. Separate the two strands of this wire 3″. Wrap a piece of masking tape around this joint to keep it from separating more. Strip ¾″ of the insulation off these wires. Twist the bare ends tightly (A). Loosen the screw in the alligator clip (B). Insert the wire into the alligator clip and push the wire through the hole. Then wrap the wire around the screw, and tighten the screw (C).



THE MPC SAFETY KEY

The MPC Safety Key is your insurance that a properly operating MPC Lunar Lectric system is going to launch your model only when YOU want it to! If you have your MPC Safety Key in your hand or pocket, you KNOW that nobody but you can launch that model! You can work around the model on the launch pad KNOWING that nobody will be able to play around with the MPC Lunar Lectric handle and launch the rocket while your fingers are underneath it.

DON'T LEAVE THE MPC SAFETY KEY IN THE HANDLE! Put it on a string around your wrist or on a large key tag so that you know where it is and can see if it has been left in the handle.

TROUBLE SHOOTING TIPS

PROBLEM 1 Key inserted and bulb does not light.

SOLUTION: This problem usually means that the circuit is not complete, or there is a loose connection somewhere. Check out the complete circuit as follows.

After one full minute approach your rocket. Remove it from the launch pad and set it safely aside. Check to make sure all connections on the launcher and battery are secure. Check the igniter clips on the launcher, to see if they're clean. If tips are covered with exhaust residue, clean with fine sandpaper, or scrape with a knife. Connect an MPC Ignitor, or a 2-in. piece of nichrome wire to the clips. Check to make sure it is a good connection. Now insert safety key into LAUNCH CONTROL. If the test light works, press ignition button. Watch for igniter wire to glow red. CAUTION! Do not hold wire with your fingers.

If bulb does not light, check the circuit again for loose connections, and make sure the bulb itself is not burned out.

A KEY IN THE HANDLE MEANS A HOT ROCKET ON THE PAD

PROBLEM 2 Bulb lights when key is inserted, but engine does not ignite when button is pressed.

SOLUTION: Follow the same "check-out" procedure as described in PROBLEM 1. If the test nichrome wire glows red hot, your problem is in the igniter placement (into the engine nozzle). Remove the igniter from the engine carefully and re-install, according to MPC's engine operating instructions.

Should the test igniter not glow at all, or glow very faintly, the problem is in the battery or the wiring. Any one or more of the following conditions could result in failure of the ignition circuit:

CHECK PROBLEM	SOLUTION
Battery connections loose or dirty	Clean and tighten.
Battery weak or dead	Replace or recharge.
Loose wiring connections	Check all connections.
Micro-clips bent or dirty	Straighten and clean with emery board, knife, fine sandpaper.

Finally, connect up the test piece of igniter wire again, insert safety key, giving it a ¼ turn, press ignition button, and watch for the wire to glow red hot. If wire heats OK, begin the launch procedure again. If the test nichrome fails to glow, repeat the "check-out" again until the problem is located.

SELECTING A LAUNCH SITE

To begin your plans for launching your model rocket you must first select a launch site. A quick trip around your local area will give you many choices for a launch site. The local school athletic field is usually the largest open field available in many communities. Choose a field that has few trees. Like Charlie Brown's kite, trees also like to eat model rockets. The field should be free of high buildings, and power lines.

NEVER ATTEMPT TO RECOVER A MODEL ROCKET FROM A POWER LINE. Shopping center parking lots cannot be used, unless authorization has been obtained. Do not choose a launch site near an airport.

Your MPC MODEL ROCKET OUTFIT box was designed to serve as a "range box". All the items necessary for a days fun of flying can be carried in your range box.

SETTING UP THE LAUNCH PAD

Choose a level area of ground on which to set up your launch pad. The MPC launch pad with its three widely-spaced legs was designed to rest solidly on uneven ground, but you should make sure that the launch pad will not tip over. If necessary, you can place a small rock on the foot of each launch pad leg, as it has been designed to allow this.

Clear the ground under the launch pad of any loose, dry grass or other inflammable material. Your MPC launch pad has been designed to prevent the rocket engine blast jet from hitting the ground, but the wise model rocketeer always makes sure that his launch area is clear.

SETTING UP THE LAUNCH CONTROLLER

Your MPC Lunar Lectric Firing System has been designed with all of the proper professional safety features in it. They are there for your safety. Don't try to by-pass them.

Always test the electrical firing system for correct operation each time you take it out to the flying field. Although it has been carefully designed for high reliability, you should always test it to make sure that all safety features are working. The following pre-launch test procedure should be part of your count-down preparations:

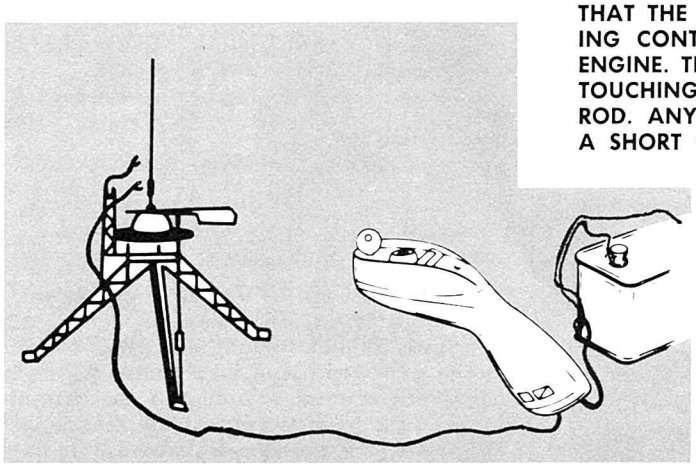
TEST #1: With battery hooked to firing system, hook up a spare MPC igniter that is not installed in an engnie. (The true test of the firing system can only be conducted with a real igniter in the system.) When MPC Safety Key is NOT INSTALLED and IGNITE button is NOT PUSHED, igniter should NOT FIRE.

TEST #2: Immediately following Test #1 with the same hook-up, and with the MPC Safety Key NOT INSTALLED, push the IGNITE button. The igniter SHOULD NOT FIRE with the MPC Safety Key not installed.

TEST #3: Immediately following Test #2, and with the same hook-up, release the IGNITE button, INSERT the MPC Safety Key. The continuity check light should come on. The igniter SHOULD NOT FIRE.

TEST #4: Immediately following Test #3, and with the same hook-up, check that MPC Safety Key is IN and turned, that continuity light is ON. Press the IGNITE button. The continuity light should go OUT and the igniter should FIRE.

MAKE SURE WHEN IGNITER IS INSTALLED THAT THE NICHROME WIRES ARE NOT MAKING CONTACT WITH EACH OTHER, IN THE ENGINE. THE TWO MICRO CLIPS CANNOT BE TOUCHING EACH OTHER, OR THE LAUNCH ROD. ANY OF THESE FACTORS WILL CAUSE A SHORT CIRCUIT.



Eveready #732 Lantern
Eveready #1463 Hot Shot
Marathon #926 or 904
Ray-O-Vac #904 or 922
Mallory M904
Bright Star #164 or #187
Burgess TW2 or S461
Burgess 4F6H or 2G8H

PREPARATION TIPS

When preparing or "prepping" your MPC model rocket for flight, keep in mind these helpful tips. They'll assist in making sure that everything works properly.

1. Don't forget the recovery wadding! If you do, the recovery streamer or parachute will be melted by the heat of the ejection charge gas. And your model will come down with a plastic glob rather than a recovery device.

2. Don't jam the wadding or recovery system in tightly! If you use to much wadding, or if you jam the wadding into the body, the ejection charge will not be able to push it forward. If you jam the streamer or parachute into the body, the same thing will happen. If the ejection charge cannot push the wadding and recovery device forward to dislodge the nose, your model may plummet back to the ground and be totally destroyed.

3. Make sure that the engine is securely installed! If the engine is not seated in the engine clip, the ejection charge may eject the engine instead of the wadding and recovery device. If this happens, your model may plummet to the ground and be destroyed.

4. Install the igniter according to instructions, but do it only on the flying field just before you are ready to put the model on the launcher. If you don't install the igniter correctly, it cannot work properly and the engine will not be ignited. Although MPC igniters are designed to be ignited only by electrical means, you should always follow the rules of the professional rocketeers who consider any rocket engine with an igniter installed to be ready to fire at any time.

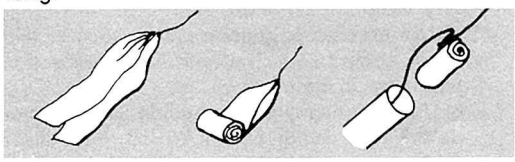
5. Your local MPC model will move through the air at very high speeds. Its fins must be on strong and straight in order to insure that your model flies properly. Always check for undamaged fins, broken fins, and crooked fins. Don't try to fly a model rocket with a cracked, broken, or crooked fin.

6. Make sure that the nose cone will slip on and off the model easily and that the shock cord or a shroud line is not wedged between the nose cone tenon and the body tube. If the nose cone is jammed and cannot come off, the recovery device cannot deploy.

7. Have somebody else check your model preparations before you fly the model. You may have forgotten something. Two heads are better than one, and you may have overlooked something because of excitement.

LAUNCH INSTRUCTIONS

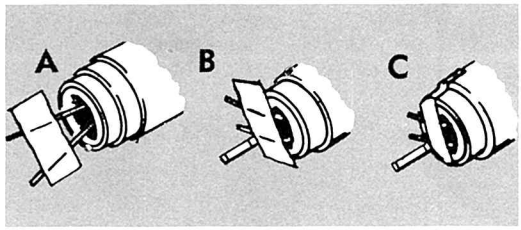
All model rockets must be launched electrically, using the MPC LUNAR-ELECTRIC or similar launching system. Check with your hobby dealer.
IMPORTANT: All model rockets must be launched from a launch rod at least 36 inches long.



To pack the streamer into your rocket, just fold where it is tied to the shock cord, and roll it into a tube shape. Insert the streamer into the body tube, and pack on top of the wadding. Pack the shock cord on top of the rolled streamer and put nose cone in place.

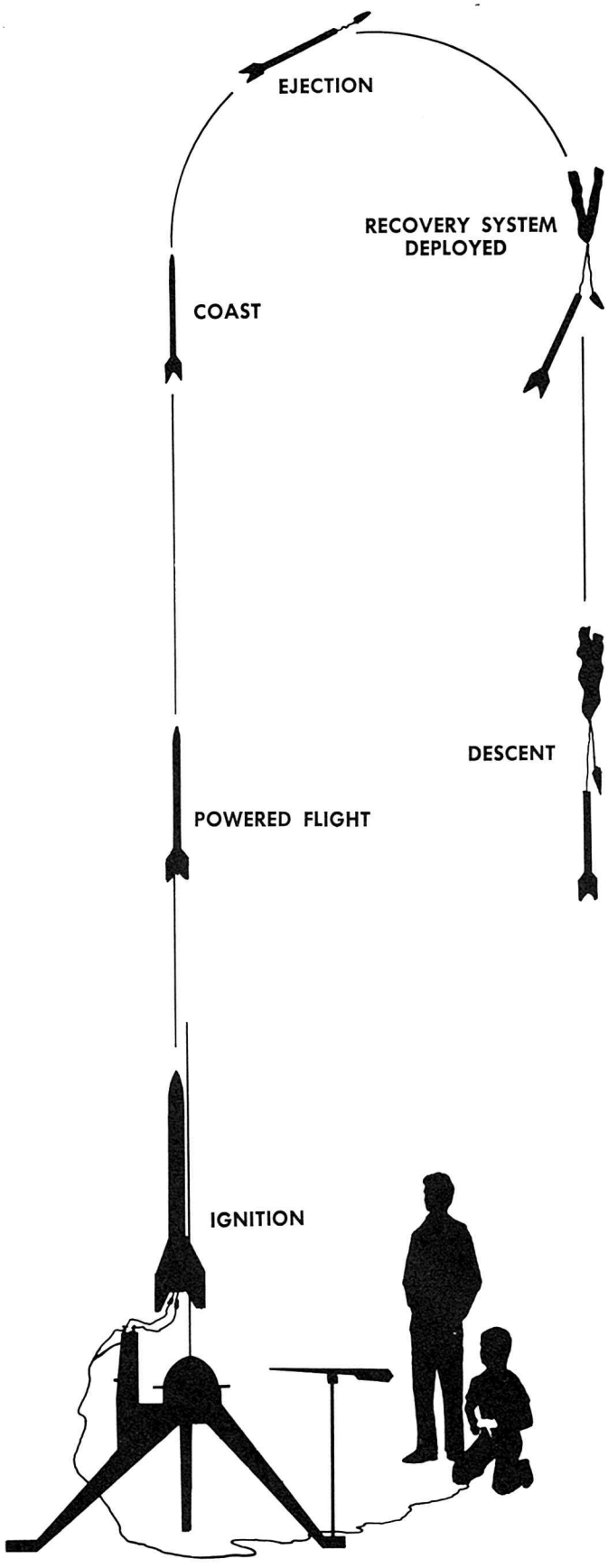
Before approaching launch pad, remove safety key from launch control handle, and disconnect leads from power source.

The engine should not be installed until you are ready to launch. Make sure the engine is held firmly in place with the engine clip.



Approach launch pad with model, engine, and Ignitor. Peel paper backing from taped Ignitor, and insert into nozzle as far as it will go (A). Bend Ignitor over against engine (B). Press tape down onto engine to hold Ignitor in place (C). Insert engine into engine compartment (with nozzle outward) until engine is locked in place, with engine clip.

Lower rocket onto the launch rod by sliding the launch lug over rod. Attach one micro clip to each of the Ignitor leads extending from the engine. Retreat to launch control and give an audible warning to persons in the area that a countdown is about to begin. Connect leads to power source, insert safety key in the LUNAR-LECTRIC launch control, or whatever launch control your using. Begin countdown procedure from countdown card, included in every MPC model rocket kit.



WEATHER CONDITIONS:

The best weather for flying model rockets successfully is clear, cloudless days with no wind blowing. Don't try to fly your model rocket if the wind is blowing more than 20 miles per hour. This is called a "moderate breeze" and raises dust and loose paper from the ground, setting small tree branches in motion as well. If you fly in a high wind, your model rocket will "weathercock" into the wind as it leaves the launcher, will fly far up-wind during its climbs, and will float far away down-wind after the recovery device deploys. You will lose your model rocket if you fly it in high winds.

You are also likely to lose your model rocket if you fly it in fog or when the clouds are low. If your model rocket flies into a cloud, you will lose it. And it has happened!

If you try to fly a white model rocket in a snow storm, you deserve to lose it!

SAFETY NOTES
READ AND FOLLOW CAREFULLY!

1. THIS MODEL ROCKET ENGINE IS NOT A TOY! Keep it out of the reach of small children and use it only with adult supervision.
2. All model rocket engines, no matter how small, must be used with caution and respect. They are intended for experimental and educational use only.
3. Store in a dry place at a temperature between 50°F and 150°F and away from other combustibles and open flames.
4. Do not tamper with a model rocket engine or attempt to change it in any way. It looks simple, but it is technically very complicated to design. Any change to the nozzle or paper casing could change the operating characteristics.
5. Do not point the nozzle of a model rocket engine at anyone's face and keep your fingers away from the nozzle. The temperature of the rocket exhaust gas is about 1000°F and it has a speed of about 1670 mph.
6. Use a model rocket engine only is lightweight, non-metallic recoverable model rockets specifically designed for them.
7. Use an electric ignition system such as the MPC Lunar Lectric Launch Controller. This is the only safe way to do it.
8. Use a vertically-pointed guide-rod launcher such as the MPC Lunar Lectric Launch Pad. Never try to fly a model rocket without using a launcher.
9. Do not attempt to re-load a used model rocket engine. It has been designed for a single use. Throw away the empty paper casing; don't give it to anyone and don't litter your flying field with it.
10. Read and follow all the provisions of the NAR Safety Code on the MPC Count Down Card. It was drawn up from the accumulated experience of professional rocket engineers and model rocketeers since 1957. Its purpose is to help you enjoy model rocketry and to learn about the Space Age in safety.