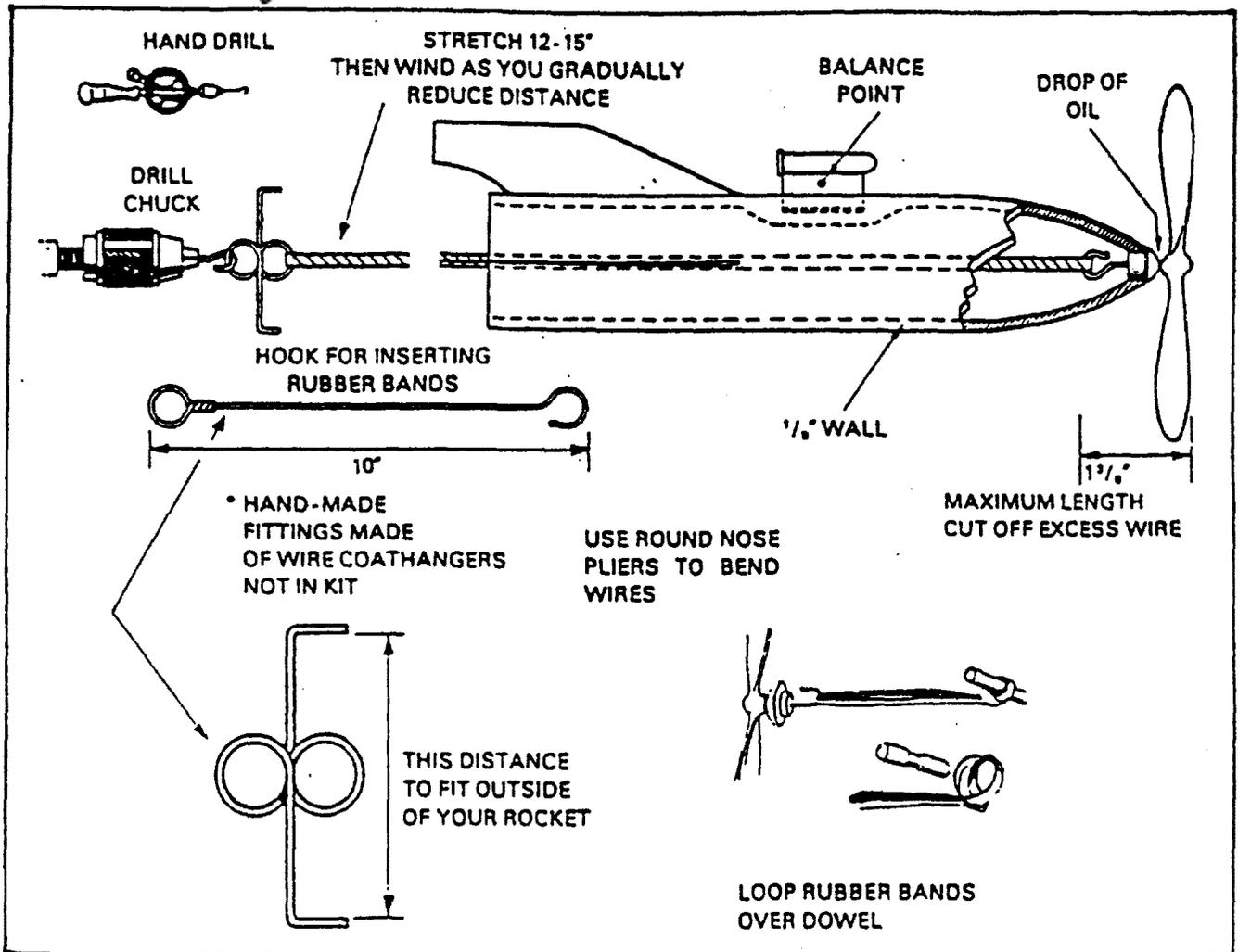
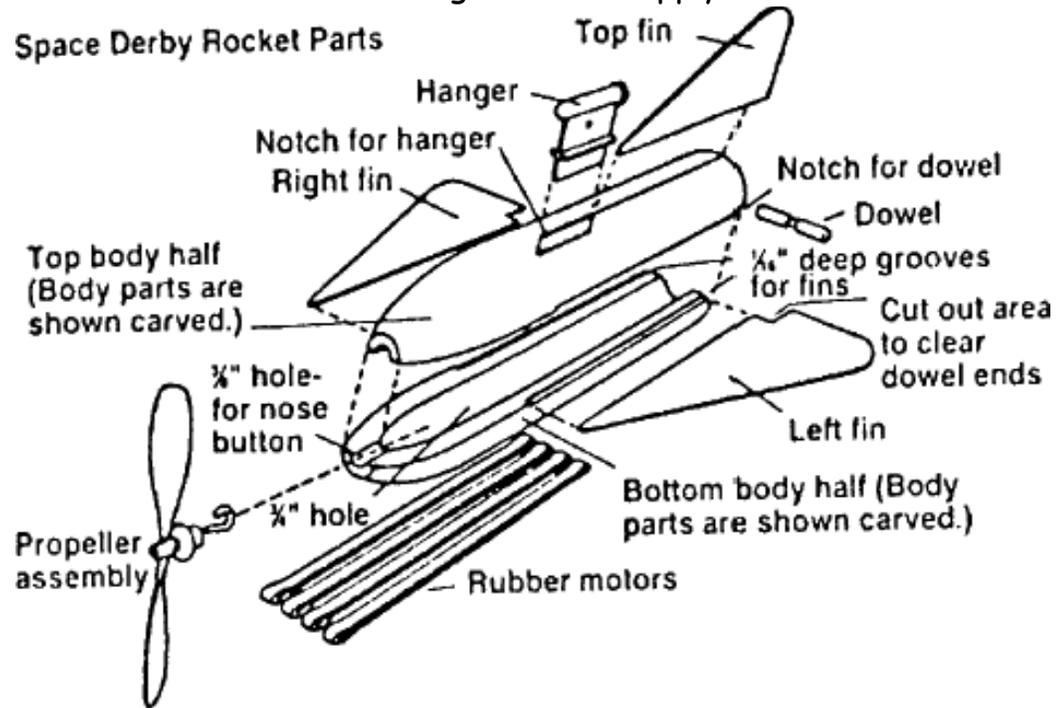


## Constructing and Operating Rockets

The official space derby kit includes all necessary materials and instructions for building. Decorate the rocket with bright colors. Apply decals furnished in the kit.



## Tips for Rocket Builders

- Reduce air friction or "drag" by making all surfaces as smooth as possible.
  - ‡ A blunt, rounded nose causes less drag than a sharp nose.
  - ‡ A good design has all leading edges rounded and trailing edges tapered to reduce the drag.
- Rubber bands should be lubricated before the race.  
*(They are the "motor" and must be strong and flexible.)*
- Use a sharp knife for cutting the grooves for the hanger fitting and fins.  
*(A dull knife will crush and splinter the balsa wood.)*
- When you start to carve, remember that the end with the small hose is the rocket nose.
- A potato peeler is good for carving the shape.
- To help increase the rocket's speed, reduce the wall thickness to a minimum of 1/8 inch. Do not weaken the area around the hanger (*carrier*) or carve away the nose button circle.
- Do not apply too much paint to the outside unless you sand between each coat.
- Be careful not to get glue on the plastic carrier, especially in the holes through which the mono-filament line runs. *(Glue can interfere with smooth operation.)*
- Make the propeller shaft as short as possible by bending it close to the prop.
- Cut off the excess wire with wire cutters.
- Test the rocket's balance by hanging it from a string through the hole of the hanger fitting.
  - ‡ If the rocket is nose-heavy, carve or sand a little wood off of the end.
  - ‡ If it's tail-heavy, remove wood from the tail area.
- Dens may wish to secure a 100-foot length of 50-pound mono-filament fishing line for test runs in the backyard before the derby.
  - ‡ Tie the line to a tree or post and string the rocket carrier on it.
  - ‡ Tie the other end to a tree about 100 feet away.
  - ‡ Make the line as tight as possible.
- Experienced rocket racers "warm up" their space ships by gradually winding the rubber band motors to full capacity.
  - ‡ Try 50 turns first, then 100, 200 and so on.
  - ‡ Release the propeller between each winding.
  - ‡ Try some backyard runs on a length of monofilament line before competition.
- Soak rubber bands in castor oil several days before the space derby.
  - ‡ This prolongs the bands' life and power, and will help prevent breaking during the competition.
  - ‡ Pack leaders should still have boxes of extra rubber bands and propellers handy for emergencies.
  - ‡ Remember that it takes three rubber bands to fly the ship properly.
- To save time, whenever a ship gives any trouble, pull it off the line and run it with the last heat.
- Allow boys to wind propellers before coming to the starting gate.
- Turn a spotlight briefly on each heat winner as his name is announced.

