CARE AND OPERATION OF YOUR

Thimble-Drome "Space-Bug" Engine

The Most Powerful, the Fastest, the Easiest Starting Engine in the ½ A Class.

No other manufacturer of ½ A engines can truthfully make this claim.

Keep this engine immaculately clean, use **Thimble-Drome Fuel,** and it will maintain its winning characteristics for a long period of time.

This engine is precisely fitted at the factory for **immediate, easy** starting and immediate flight. A break-in period in the ordinary sense is not necessary for flight, in fact, a slow easy break-in is not desirable. Most of these engines will develop full power within one minute of running time; but a few, those which are slightly on the tight side, may not develop full power under three hours. Even these will develop sufficient power for average flying almost immediately. The only break-in required is very rich (slow) running the first 60 seconds after starting the first time. After 60 seconds it should be ready to go.
Elimination of break-in is **not** attained through loose or sloppy fitting but through very precise fitting, together with super fine wearing surfaces.

(A) PREPARATION FOR RUNNING

1. Mount the engine in the plane or if you want to give it some running first, mount it on a narrow board, about 2" wide and fasten the other end of the board in a vise or nail it to something. **Do not hold the engine directly in a vise.** The 4 ears at the rear of the tank are for mounting. Use the template, A-Fig. 1, to drill mounting holes and breather hole. **The screened nut, B-Fig 1, in the rear is the air intake hole and must be left open.**

2. Place propeller on the shaft with the flat side of the blades toward engine and lock securely with the propeller nut.

3. Get a new or thoroughly cleaned oil can and slip a piece of ⅛" neoprene tubing on the spout. This will be used for filling the fuel tank. If you prefer you can buy a fuel pump from your dealer to screw directly on to the fuel can.

4. Procure a 1½ volt dry cell battery, # 6 or equivalent, and connect it with 2 flexible insulated wires to a glow plug clip as shown in the diagram A & B-Fig. 2. Do not use a stronger battery. If you do the plug will burn out. The connections should be soldered to insure good contact and taped to prevent bare ends of wire from getting together and "shorting" the battery. Be sure the battery is a good one. Your dealer sells batteries, wire, and glow plug clips.

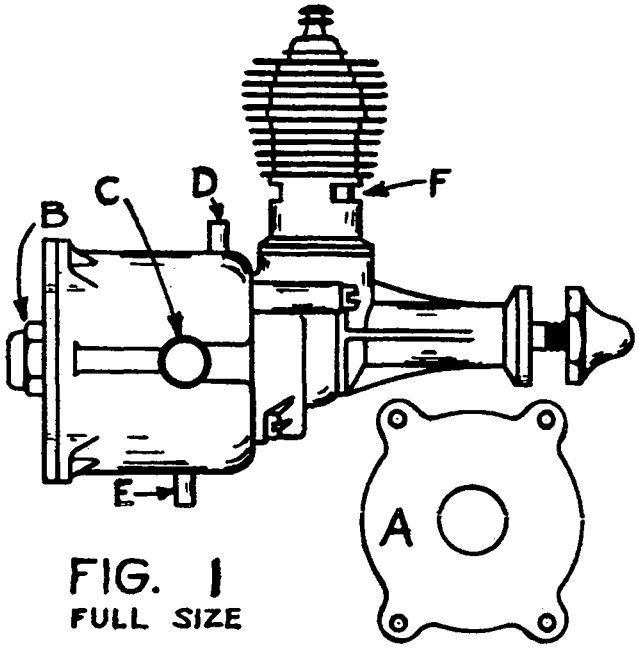


FIG. 1
FULL SIZE

5. Balance and trim the propeller. This is very essential for good performance. Sand off any bead of plastic along edges of blades. Fit a drill or shaft through the hole and rest the shaft on razor blades set in wooden blocks as shown in C-Fig. 2. Sand the heavy blade until the propeller will balance in a horizontal position. Care must be exercised to do the sanding without spoiling the airfoil characteristics.

(B) STARTING THE SPACE-BUG ENGINE

No matter how expert you are with small engines you will have better luck with this one if you follow directions exactly as listed and do each operation in the exact order given.

1. Close the carburetor needle valve, C-Fig. 1, by turning it clockwise till it stops. Do not force it.

2. Slip the filler hose of your pump or fuel can over the filler tube, D-Fig. 1, pump in fuel till it overflows through E-Fig. 1. Do not use gasoline. Use **Thimble-Drome Fuel.**

3. Connect the battery by snapping the clip on the glow plug, B-Fig. 2.
4. Open the needle valve (counter clockwise) exactly 4 full turns.
5. Turn the propeller to the position so that the exhaust ports F-Fig. 1 are wide open. Squirt 5 or 6 drops of fuel into the cylinder through one of the port openings. This is called priming.
6. Flip the propeller over snappily with the finger tip to start.
7. When the engine starts it will be running very rich and slow. The first time the engine is started let it continue to run very rich for a period of 60 seconds, the slower the better. After approximately 60 seconds, slowly close the needle valve clockwise to the best running position and remove the battery connection. Subsequent starts may be adjusted to best running position immediately.
8. Should the engine start backwards, stop it by putting finger over propeller nut and putting pressure on propeller. As soon as it stops flip it again. It is likely to start in either direction.

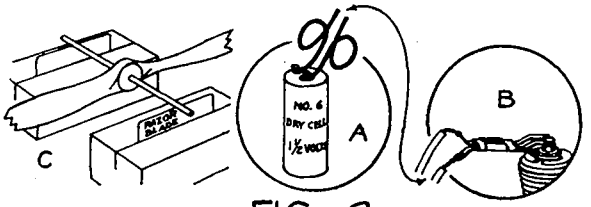


FIG. 2

(C) FAILURE TO START

1. If the engine coughs and spits a bit of fuel spray from the exhaust, it is too rich. Close the needle valve and continue cranking until the engine starts briefly. Open the needle valve again and crank it over. It should start immediately.
2. If it starts up with lots of power and dies immediately it is too lean. Open the needle valve a half turn, prime the engine, and crank it over again.
3. If engine fires with a burst of power then dies repeatedly after each time it is primed, and this is not cured by opening the needle valve more, the fuel jet is stopped up. If the engine has not been run for some time it is likely that it is only stopped up with castor oil. Choke the engine by holding a finger over the intake, B-Fig. 1, and flip the propeller over 3 or 4 times. This will remove the castor oil and the engine should start. If the same symptoms re-occur, the jet possibly has dirt in it and this should be blown out as per next paragraph.
4. Stopped up fuel line or jet. Remove the needle valve. Blow in to the filler tube, D-Fig. 1, with high pressure air such as available at service stations. **Never blow into the venturi tube, B-Fig. 1.**
5. If the engine refuses to fire at all screw the glow plug out and connect it to the clip. If the little coil inside does not get red hot, it is either burnt out or the battery is dead, or the connections are made incorrectly. Replace the battery or the plug, or correct the connections. Glow plugs are **never** guaranteed. Do not return the engine to the factory for a burnt out glow plug because the cost to you will be excessive. Buy one from your dealer.
6. Weak cranking sometimes retards starting. Crank with a snap.
7. If you are not using Thimble-Drome fuel, try it. **Never use gasoline or gasoline type fuels.**
8. Very heavy priming is often required for starting. These engines do not flood out as easily as most. Unless it is actually spitting out raw fuel it may need even more priming even though you have already primed it as much as most engines will stand.
9. If the plug, battery, and connections are known to be good, and if the jet has been checked for stoppage, and if the fuel is known to be the correct kind, yet the engine will not fire at all, it is possible there is dirt or a piece of foreign matter under the reed valve. This is very unlikely unless the venturi screen has been removed. If the venturi screen has been removed you may expect this trouble. The foregin matter can sometimes be removed without taking the valve assembly apart. If it is necessary to take it apart, pry the reed housing off with 2 screw drivers, using them on opposite sides of the cap simultaneously. Refer to Section D, Par. 4.

(D) OPERATING TIPS AND ENGINE CARE

1. Always empty the fuel tank on your last run by running the engine until it quits. Never put the engine away with fuel in it.
2. After the last run, oil the engine with a light oil (SAE 10 is good) and wrap it with cloth or otherwise protect it from dust and dirt.
3. If the engine gets dirt on it through crack-up, or otherwise, do not run it until it is thoroughly cleaned. **Take it apart,** wash it, oil it, and re-assemble.
4. Do not tamper with the reed valve assembly unless it is known that dirt is in the reeds. This is a very critical part of the engine and tampering can do no good. If it is necessary to remove the reeds, pry off the housing to get them out. All valve parts must be handled with extreme care and must be replaced in the exact position and in the exact order they were in before removal. To re-assemble, place the housing on a smooth hard surface. Put the valve components in place. Put the tank against the housing and with a piece of wood over the tank for a cushion, drive it lightly in to place.

OPERATING TIPS (D)—Continued

5. If the engine gets tight it is not frozen up. Do not send to factory. A new engine will sometimes tighten up a few times, especially after slow runs. This is more likely to happen and will occur more often to an engine that is properly fitted and has properly smooth wearing surfaces. Do not run it tight. This is caused from a shellac like deposit on the cylinder wall. Screw the head off. **Remove the cylinder** and scour the inside wall very lightly with a bit of fine or medium steel wool. Wash, oil, and replace. The engine will then turn over freely and run good. **Never** use sandpaper, emery cloth, abrasives of any kind, or scrapers. Such methods will ruin the cylinder.
6. Erratic running is caused by an unbalanced condition. Loosen the propeller and turn it over a half turn and re-tighten it. If this does not smooth out the operation of the engine, either re-balance the propeller or replace it. Erratic running is also caused from tightening due to shellacing of the cylinder. Refer to par. 5 this section.
7. Due to the very precise nature of the fitting of various parts a break-in period is not necessary. The engine is ready to start and ready to fly. With proper care, especially concerning clean operating conditions and protection from dust and dirt, as well as use of properly lubricated fuels, the engine will continue to improve in power and speed for many running hours.
8. During the first 2 hours of running time do not use a propellor that will lug the engine. A 6"-3 pitch, a 6"-2 pitch, or a 5"-4 pitch will do. Unless you are flying a very small or very fast plane do not use more pitch than recommended because lugging the engine will cause the cylinder to shellac up and get tight.
9. Certain kinds of weather, especially warm humid (sticky) weather will cause excessive shellacing in a new cylinder. There is no known way to eliminate this nuisance and the smoother the fit the more susceptable is the engine to this trouble.
10. Do not tighten the head too firmly. Set it up very lightly. Allow the engine to cool before removing head so it will loosen easier. Too much pressure against the exhaust ports to hold the cylinder from turning may force the cylinder out of round or even turn a burr into the bore. A new cylinder is usually required to remedy such damage.
11. **Do not** under any circumstances use a plastic propeller on this engine unless the manufacturer of such propeller expressly recommends it for use on Thimble-Drome engines and so labels it.
12. For those who want even more speed and power the factory makes available a racing kit which includes a special racing carburetor tank assembly and a racing head. While starting with this combination is slightly impaired it is still very good and the speeds are terrific. Try it. Do not install this combination until the engine has at least ½ hour of running time.
13. If the plane requires the engine to be mounted with the cylinder pointed down or pointed to the right or left, do not turn the tank over. Remove the 4 screws which hold the tank and crankcase together. Pull the crankcase off of the nose of the tank, turn it to the required position and replace the screws.
14. The first time you start your engine the excess castor oil from the exhaust will be dark colored for a few seconds but will clear up immediately. All engines do this if they have never been run before. This is due to excessive wear during the first few seconds as the wearing surfaces polish in.
15. To fly the plane clockwise around the circle the fuel tank should be turned over 90 degrees. The vent tube then becomes the filler tube, and the filler tube becomes the vent tube.
16. This engine has been developed expressly for airplane use and its use in automobiles and boats is not recommended. Engines cannot be made to give peak performance on both jobs. If they are recommended for both they do not give the best performance in either.
17. This engine will run at full power in either direction and may be used on a pusher plane using a standard propeller.

SPECIFICATIONS

Wt.—1.62 oz. Bore—.406", Stroke .386", Displacement .0499 Cu. In. Mounting radial, Overall height—2½", length 3¼", Width—1⅛", Shaft Size—⅛", Piston—no rings, Intake Valve—reed, Rotation—right or left.

RPM—subject to fuel and weather conditions. The following readings taken from Electronic Stroboscope manufactured by Communications Measurements Laboratory: Engine—picked at random—1 hour running time—Fuel, Thimble-Drome. Weather—Cloudy, overcast. Temperature—68, Humidity—58, Barometric Pressure 1012.5 Milibars, Dew Point—61, Eelevation 200 ft. above sea level. Test—Static, Propellers—Tornado Plasticote, trimmed and balanced.

Engine	Propeller Size	Pitch	RPM
Standard Engine	6"	3	over 16,000
" "	6"	2	over 17,500
" "	5"	3	over 20,000
Equipped with racing combination	6"	3	over 17,500
" "	6"	2	over 20,200
" "	5"	3	over 21,000
" "	Using flywheel		approx. 30,000

Static Thrust using a racing combination and 6"-3 pitch propeller—17¼ ounces.

WARRANTY

This engine is guaranteed against defects in materials and workmanship for 30 days from date of purchase. Your warranty card must be in our file, signed and dated by your dealer. Glow plugs are never guaranteed because of their delicate nature. No other guarantee is made or implied. If engine is returned to the factory within warranty, include 50c to cover cost of handling and return postage. **Do not take engine back to your dealer.**

FACTORY REPAIR SERVICE

Minor repairs, examinations, or adjustments—$1.00 plus parts. Complete overhaul (guaranteed new engine performance)—$3.75, including parts. On all COD shipments, purchaser pays postage and COD fees.

PARTS ORDERS

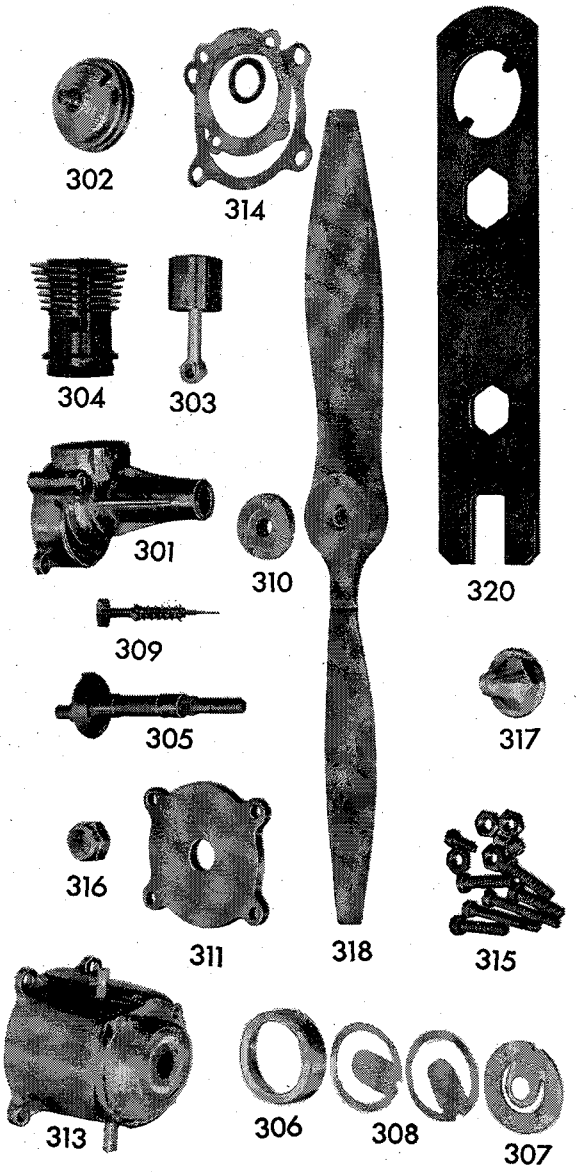
Purchase parts from your dealer. If not available, order direct from factory. No COD's please. Send remittance with your order. On orders less than $2.00 add 35c handling charge. In California add 3% sales tax.

Prices and design of parts subject to change without notice.

ENGINE PARTS LIST
For .049 Space-Bug

Catalogue Number	Part	List Price
301	Crankcase	$1.50
302	Cylinder Head & Glow Plug (standard)	.65
302 RH	Cylinder Head & Glow Plug (racing head)	.65
303	Piston & Rod	1.50
304	Cylinder	1.50
305	Crankshaft	1.75
306	Reed Housing	.25
307	Reed Back Plate	.25
308	Set of Reeds	.50
309	Needle Valve & Spring	.60
310	Propeller Drive Washer	.15
311	Fuel Tank Plate	.25
312	Fuel Tank with reed valve assembly	2.90
313	Fuel Tank	2.00
314	Gasket Set	.25
315	Set of Screws	.15
316	Fuel Tank Nut & Filter Screen	.20
317	Propeller Nut	.20
318	Propeller 6"-3 Pitch	.25
319	Space Bug Decal Set	.20
320	Wrench	.25
322	Racing combination: special carburetor and head	3.50

When Ordering Engine Parts, Use Catalog Number



L. M. COX MANUFACTURING CO.
730 Poinsettia P. O. Box 476 Santa Ana, Calif.