Le POU du CIEL (FLYING FLEA)

● The novel creation of a French carpenter, "Le Pou de Ciel" (means "Sky Louse", but popularly known as the "Flying Flea.") was intended as a home-built to put anyone with $500 into the air. Among some of the unusual features incorporated into the design were one-piece wings in a tandem arrangement, no elevator or ailerons, and a huge flying rudder. The wing was pivoted for pitch control, while the rudder and unusual curved dihedral functioned in place of ailerons. All in all a simple and unique approach to the homebuilt aircraft. Indeed, Henri Mignet's philosophy behind his creation was: "If you can nail together a packing case you can construct an airplane."

The model described was decided upon because it offered a way to pack as much wing area as possible into a 13-inch wingspan. Since no 3-views were available at the time of construction, it was decided to make the project a fun-type airplane. Another dividend is the superbly adequate ventilation for the engine and tank.

The plane shown in the plans differs from the original in only two major aspects. The firewall has been changed in design to give more support. Secondly, the amount of incidence in the front wing has been changed from five to three degrees. The original required considerable nose weight to obtain a proper glide. The reduction in incidence along with the use of light wood should eliminate this need.

CONSTRUCTION

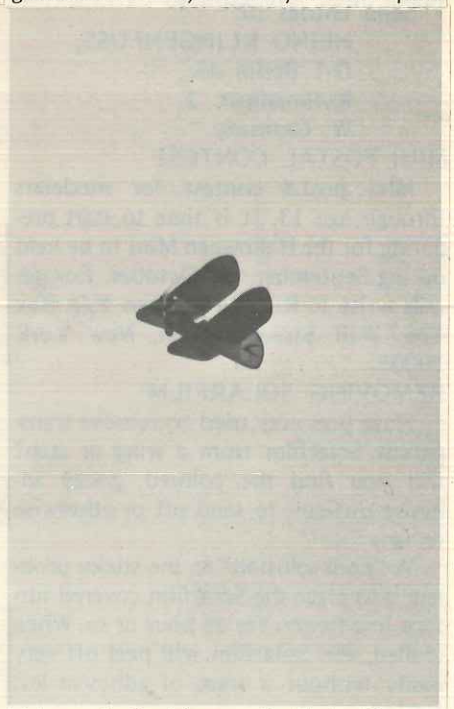
Mr. Bill Hannan and Mr. Walt Mooney have presented articles on the construction of all sheet models in the past issues and a rewrite will not be attempted. Only a couple of minor points shall be discussed here. First, all piano wire-to-wood joints are accomplished with epoxy cement. These include former sandwiches and wire-to-wing support keys. Note it is also easier to first align the front wing once the fuselage and rear wing assemblies are complete, and then glue on support keys accordingly. Also, the firewall is .020 inch sheet tin stock, the ears bent around the support at F1 and silver-soldered in place. Finally, a rubber shock mount is made from six layers of an old toy balloon glued together with rubber cement. This is cut to fit snugly between the engine and the front of the firewall. Remove any unnecessary excess which might show or catch dirt.

Two props have been tried on this model so far and both work. The Williams Brothers prop, shaved down to a 4-inch diameter, gives a somewhat better performance.

FLYING

This model is an exceptionally easy plane to trim and fly. Start by test gliding the model over the proverbial tall grass, on a calm day. If the model shows a further need for nose weight, remove the top sheeting from the area foreward of F1 and add the necessary ballast. When a flat, floating glide is obtained, replace the sheeting and prepare to make the first powered flights. The model should climb steadily in left-handed circles 25 feet in diameter. Use the rudder to adjust the amount of turn, as no thrust adjustments should be necessary. The original model flew well from the start and so there are few trimming hints that I am able to pass on. In view of this fact, I should instead like to discuss a crucial, yet often neglected subject . . . that is, the care and handling of the powerplant itself.

As compared with most other powerplants, the Brown Jr. CO_2 engine is a relatively new product on the market. Admittedly, CO_2 engines have come and gone before this, but they are still quite mysterious to many modelers. Only recently have they begun to gain wide acceptance due to the Brown Jr.'s quiet nature. Also, the practicality of its small size and light weight haven't hurt it any either. Note that the cost of airframes is measured in pennies and not dollars.



Living up to its nickname, the Flying Flea heads skyward. It's very stable.

Unlike the internal combustion engines available on the market today, the CO_2 engine is instead related to the steam engine . . . an *ex*ternal combustion engine. The only difference is the use of CO_2 as a working medium, and the absence of a furnace. Because of CO_2's low boiling temperature at high pressures, this engine has a neat little trick. To keep the process moving, the engine absorbs heat from the atmosphere through its structural surface to change the liquid CO_2 into a vapor. This is why ventilation is so important. Indeed, if the engine were perfectly insulated from its surroundings, the process would soon stop.

Since this engine is so different in concept and habits, it makes a break-in period imperative . . . not so much for the engine, but for the proud and unsuspecting new owner. This is why a good, simple training plane is of utmost importance to the uninitiated. By all means don't start with a sophisticated scale model which will produce nothing but grief and frustration. The author built as a first project a Curtiss JN-4D and nearly destroyed the engine because of sheer inexperience. So pick a model with adequate ventilation and protection of the engine.

For the benefit of all concerned, the following mistakes should be avoided:

1. Never fuel or install the pressure vessel in an inverted position. This will force liquid CO_2 directly into the engine, producing a frozen or ruined engine.

2. Piston should be out of compression position (top visible in ports) when fueling.

3. When flying in conditions such that a layer of ice builds up on the pressure vessel (during engine run), wipe ice and moisture off engine. Let engine sit and warm before fueling and running again. Ice is 100 times poorer a conductor of heat than is aluminum, and this condition allows liquid CO_2 to get

4. When selecting a model, or design-

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ing your own, ventilation of the engine and tank should be a primary consideration. The Brown Jr. CO_2 engine is easily encowled but to seal it in completely and paint on air ducts is sheer folly.

5. Always use silver solder to repair damage to joints. It's stronger and localizes better. Disassemble area being repaired to prevent heat damage to seals or gooping up the ball valve with solder. Disassembly also gives one a better feel for the engine and the concepts behind it.

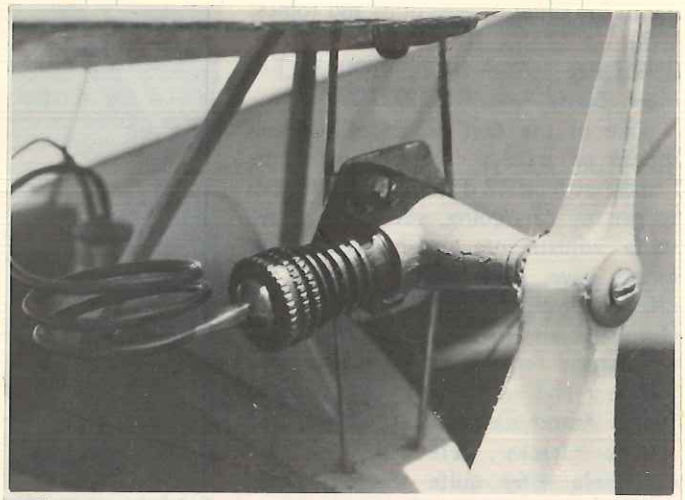
6. On the matter of oiling this engine, follow the instructions. If it has been sitting a couple of weeks, and appears dry, oil before running. I like to completely disassemble my engine every few months and clean out any old oil, and clean the pipes and tank too. A dark yellow oil sometimes accumulates in the tank over a period of a few months. Always oil both the piston and crankshaft bearing.

7. As with any type of engine, always make sure prop and engine are firmly affixed to their mounts. There are many ways to mount the engine without reworking the engine mount. Use 00-90 brass screws and nuts, or screws from an old watch. Brass 00-90 screws are available from the model railroad counter at better hobby shops.

8. Periodically check condition of seals and replace those which are worn or cracked.

9. Don't remove a near-empty cartridge from the load-n-launch gun by loosening the holding screw. If one does this, one stands a darn good chance of blowing a seal. Instead, loosen the front nozzle by giving one turn and allow the last of the gas to escape. Now slowly loosen the hold-down screw and if more gas starts to leak, stop. Finally, when the cartridge is removed, tighten the front nozzle and load gun as per instructions.

So, the next time things get dull at the flying field, why not unleash this cousin to a Volkswagen Beetle? But be careful! You could find yourself hooked on CO_2 for life. ●



Close-up shot of the engine installation, Simple, isn't it? Author gives a lot of good hints on CO_2 engine operation in this article.

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