

Now It Can Be Told—

## CHANGING HORSES IN MID-AIR

BACK in the spring of 1942 when the Navy still had an active glider program and Captain Ralph S. Barnaby's glider development and test unit was going full blast at the Naval Aircraft Factory, Philadelphia, a glider operation came up in which it became desirable to switch the tow of a glider from one tow-plane to another while in flight.

After a few nights of midnight-oil burning, Captain Barnaby came up with a scheme and sketches for the necessary equipment. The parts were quickly manufactured and installed, and on June 6, 1942, with Captain Barnaby at the controls of the Navy's Schweizer LNS-1 sailplane, the first aerial transfer of tow-plane was attempted and successfully completed. In the following months many such transfers were completed, both by Captain Barnaby and by other pilots of his glider group.

A pick-up hook as shown in Figure 1 was secured under the leading edge of the right wing of the tug as shown in Figure 2. From the eye of the hook a towing pendant ran to the tow fitting at the tail of the tow-plane. Actually the pendant ran in along the under side of the wing and back along the bottom of the fuselage, held in place by masking tape. A "plug" or stopper was installed at the tug end of the tow line right next to the ring.

The only modification to the sailplane was the elimination of the automatic release for backward pull on the tow line.

The sailplane was towed aloft by one tow-plane and released while flying in the high position at 3000 feet altitude by tripping the tow line at the tow-plane end, thus leaving the sailplane in free flight with its tow line trailing aft and below. Rendezvousing at a pre-designated spot the glider pilot placed his ship in straight flight at a pre-determined air speed. The pick-up plane approaching from the rear laid his right wing on the tow line about two-thirds of its length back of the glider and kicking a slight amount of left rudder slid off to the left catching the tow line in the hook. As the pick-up plane eased around to the left and out in front of the sailplane, the tow-line slid through the hook till the stopper fetched up against it, stripping the hook from its clips and the pendant from its masking tape securing;—and the hook-on was complete. Inasmuch as the free end of a tow line in flight whips around a bit it was found advisable to tie an "Irish pennant" consisting of a 20 ft. length of rope to the ring at the stopper end to stabilize it and keep it from whipping around as it slid into the hook.

By having two tow fittings on the sailplane, to the second of which is secured a spare tow line suitably secured so that it could be broken out and trailed by the sailplane pilot it would be unnecessary for him to break it out until he desired to be picked up. Again, if the towplane also is equipped with two tow fittings it would be possible for it to pick up a sailplane which it had previously released. This, it is believed, will make possible the exploration of soaring conditions in spots where landing conditions are unsatisfactory,—over-water thermals, for instance about which much has been written and discussed.

With the dual tow fitting installation in the glider, it is also practical to shift the tow without the necessity of the glider being "on its own" at all. When it is desired to shift tow, the glider pilot trails his second tow line. The pick-up tow plane hooks on, moves around in front off on the proper side and moves slowly ahead taking up carefully on the slack until he is taking the towing load. At this time the glider pilot trips the first tow line and the transfer is complete.



FIG. 1 THE PICK-UP HOOK.

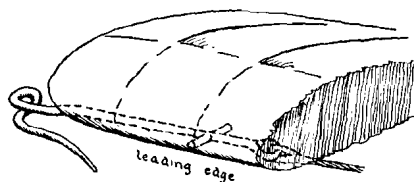


FIG 2 INSTALLATION OF THE HOOK AT THE WING TIP



FIG 3 THE STOPPER INSTALLED ON THE TOW-LINE

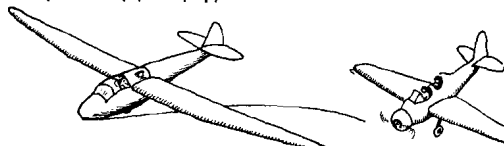


FIG 4 APPROACHING FOR THE PICK-UP

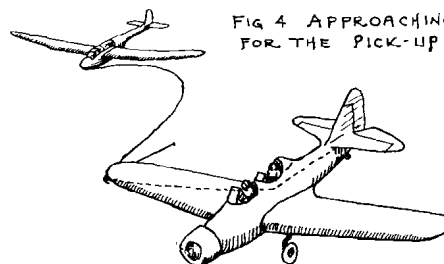


FIG 5 TAKING UP THE SLACK

"GREEN AIR" or "RED AIR"

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