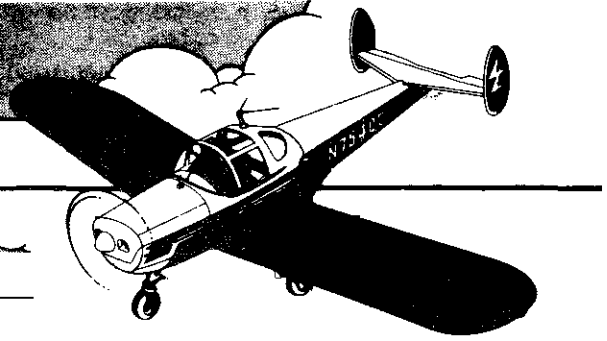


SERVICE BULLETIN

Ercoupe



No. **105** Date July 1, 1959

F.A.A. APPROVED

Subject: Rudder — Modification of

It has been found necessary to increase the strength of the rudder at the control horn attachment on all existing Ercoupes that have Serial Numbers 1 to 3335, inclusive. There has been a past mandatory modification, as found in Ercoupe Service Bulletin No. 23. This bulletin constituted a rudder reinforcement plate and long special screws in order to give increased strength to the rudder. This measure has not entirely eliminated rudder failure.

It is, therefore, recommended that the main rudder rib be replaced in accordance with this Service Bulletin no later than the next 100 hour check, except in the case where visual inspection indicates immediate attention is necessary. To obtain the additional strength needed, it is necessary to replace the old rudder main rib (415-24012 L/R) with the current production one (F-24015 L/R) which is better designed for the strength required. This modification should be made by an experienced A & E Mechanic who has the necessary equipment.

1. Removal of Rudder Assemblies (415-24001 L/R)

- (a) Remove stabilizer access door (415-21014 L/R), located at each end of the lower side of the stabilizer, by removing the truss head screw (415-21001-5).
- (b) Disconnect push rod (415-52022) from rudder control horn (415-25002 L/R) by removing cotter pin (415-20010-12), shear nut (415-20010-9), and bolt (415-20010-4).
- (c) Disconnect middle rudder hinge from rudder by removing the two cotter pins (415-24001-9), shear nuts (415-24001-2), plain washers (415-24001-8), clevis bolts (415-24001-1), and spacers (415-24001-11).
- (d) Disconnect lower hinge from rudder by removing the two self-locking nuts (415-24001-3) and truss head screws (415-24001-5 and 415-24001-4). (The longer truss head screw, No. 415-24001-4, is used to allow for thickness of bonding jumper, No. 415-22030.)
- (e) Remove rudder by removing the two self-locking nuts (415-24001-3) and truss head screws (415-24001-5) from the upper hinge attachment to rudder.

2. Removal of Outboard Skin (415-24001 L/R)

- (a) (The outboard skin is the one to which the hinges were attached.) Carefully remove all rivets from the trailing edge so as not to elongate the present holes. Then remove the rivets attaching the skin to the spar on either side of the hinge fittings.
- (b) Remove the five (5) explosive rivets that attach the skin to the main rudder rib. This rib is one that is positioned horizontally and is not to be confused with the diagonal stiffeners which do not have to be removed.
- (c) Remove rudder control horn by removing the three attaching screws.
- (d) The outboard skin assembly can now be removed.

3. Removal of Old Rib

- (a) Carefully remove the seven AN 426-3-3 rivets that attach the rib to the inboard skin (415-24013 L/R)

4. Preparation Necessary for New Rib Installation

- (a) Back drill #40 hole, "A", at nut plate end of new rib (F-24015), as illustrated in Figure 1.
- (b) It is necessary to trim the stiffener located at the bottom end of the rudder outboard skin as noted in Figure 2. (Note illustrations and procedure before trimming the stiffener.)
 - (1) To trim the stiffener for clearance, it is suggested that four rivets, at the end to be trimmed, be removed.
 - (2) The rib can now be trimmed as shown in Figure 3.

(3) Locate and drill #40 hole for additional rivet at cut off end, as shown in Figure 3, so that the reinforcement plate will be picked up.

(c) Re-rivet the stiffener to the skin with AN 426 AD 3-3 rivets, and plug the open hole which was left with a AN 426 AD 3-3 rivet.

5. Installation of New Rudder Main Rib.

(a) To locate new rib on inboard skin, reinstall rudder control arm and cleco pick up hole in trailing edge of rib to the inboard skin.

(b) With new rib now positioned, drill six (6) #40 holes by back-drilling through old holes in inboard skin.

(c) Drill #40 hole through rudder spar by back-drilling through pilot hole "A" in new rib, (nut plate end.)

(d) With rib located and drilled, remove the rib and dimple the #40 holes that pick up the inboard skin.

(e) Rivet the new rib into position on the inboard skin using AN 426 AD 3-3 rivets.

(f) Rivet the new rib to the rudder spar using an AN 470 AD 3-4 Universal Head Rivet.

6. Cover Holes in Outboard Skin

(a) If the rudders were modified per the previous Ercoupe Service Bulletin No. 23, there will be two holes in the outboard skin where the attaching screws of the control horn protruded. To cover these holes, use the two screws (AN 515-6-6) and nuts (AN 365-632) as noted in Figure 4. (Note: If "T" shaped reinforcement was installed in accordance with the previous service bulletin, it may be used for additional strength by attaching it to the outboard skin with the screws used to cover the open holes, or it may be omitted.)

7. Reassemble Rudder

(a) Position outboard skin to pick up holes in the new rib. Locate holes and drill five (5) #30 holes, using old holes in outboard skin as guide.

(b) Secure outboard skin to new rib with Du Pont #DR-134A-6 Explosive Rivets. This rivet is installed by placing it into the hole and pushing securely, on the head of the rivet with a soldering iron or equivalent, which heats the rivet and causes it to explode. It may take thirty seconds or so before the rivet is sufficiently heated to explode. (Cherry Rivets are acceptable but are difficult to install in the two holes toward the trailing edge.)

(c) Rivet trailing edge of rudder (remember to include trailing edge reinforcement) with AN 470 AD-3-4 rivets. (Heads should be on outboard skin side.)

(d) Rivet the outboard skin to the rudder spar with AN 470 AD 3-3 and AN 426 AD 3-3 rivets as needed.

(e) Install the rudder control horn with AN 526C-1032-10 screws, as shown in Figure 4.

8. Reinstall rudder assemblies in the reverse order of Step 1. (Note the bolt used to attach the push rod to the rudder horn requires careful adjustment of the nut to prevent binding of the clevis part. Still, it should have no looseness that will result in rattling.) Check rigging in accordance with Service Department Memorandum Number 35.

The Rudder Modification Kit, No. FMK-22, is available for this modification and includes the following parts:

<u>Nomenclature</u>	<u>Part No.</u>	<u>Req. No.</u>	
		<u>Per Airplane</u>	
Main Rib - Rudder	F-24015	1L/1R	
Screw Truss Head AN 526C-1032-10	415-24001-6		6
Nut AN 365-1032	415-24001-3		2
Screw AN 515-6-6	- - - - -		4
Nut AN 365-632	- - - - -		4
Explosive Rivet Du Pont #DR-134A-6	- - - - -		5 *
Rivet AN 470 AD 3-3	- - - - -		4 *
Rivet AN 426 AD 3-3	- - - - -		36 *
Rivet AN 470 AD 3-4	- - - - -		54 *
* Extra parts included			

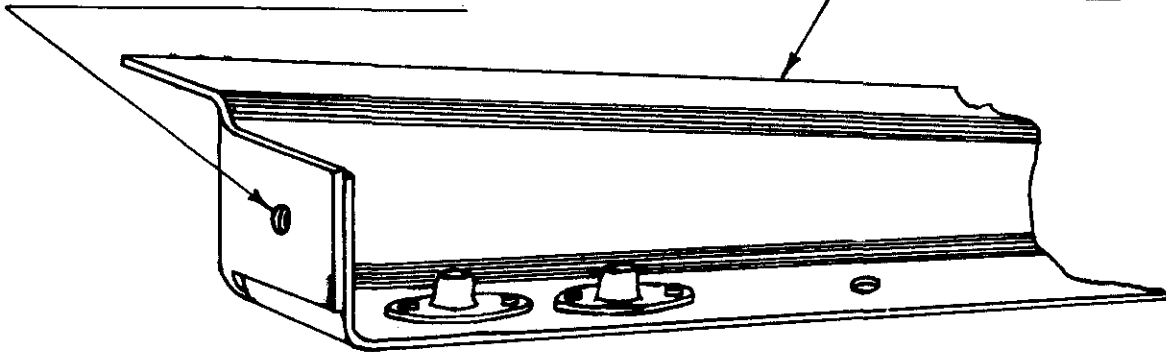
Note 1: Customers may send in their rudder assemblies for quick, factory service. Forney Aircraft will accomplish this modification and return the assemblies.

Note 2: In modifying rudders on airplanes Serial No. 1 to No. 113, it may be necessary to replace the outboard skin because of difference in original construction.

FIG. 1

HOLE "A"
DRILL THROUGH #40

F-24015 RIB



RIGHT-HAND RIB SHOWN
LEFT-HAND RIB OPPOSITE

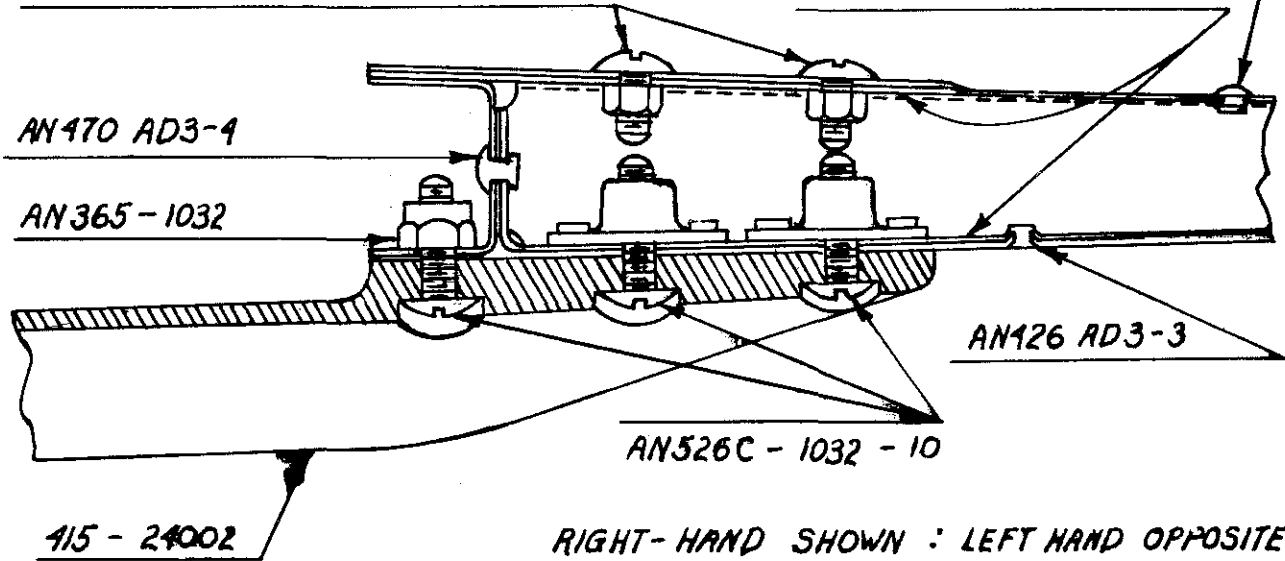
DETAIL SHOWING POSITION FOR DRILLED HOLE "A" IN RIB ASSEMBLY

FIG. 4

COVER HOLES IN OUTBOARD SKIN
AN365-632 NUT
AN515-6-6 SCREW

DUPONT #DR-134A-6
EXPLOSIVE RIVET

REINFORCEMENT PLATE
415-24007



RIGHT-HAND SHOWN : LEFT HAND OPPOSITE

DETAIL SHOWING LOCATION OF HOLES TO BE FILLED IN OUTER SKIN

