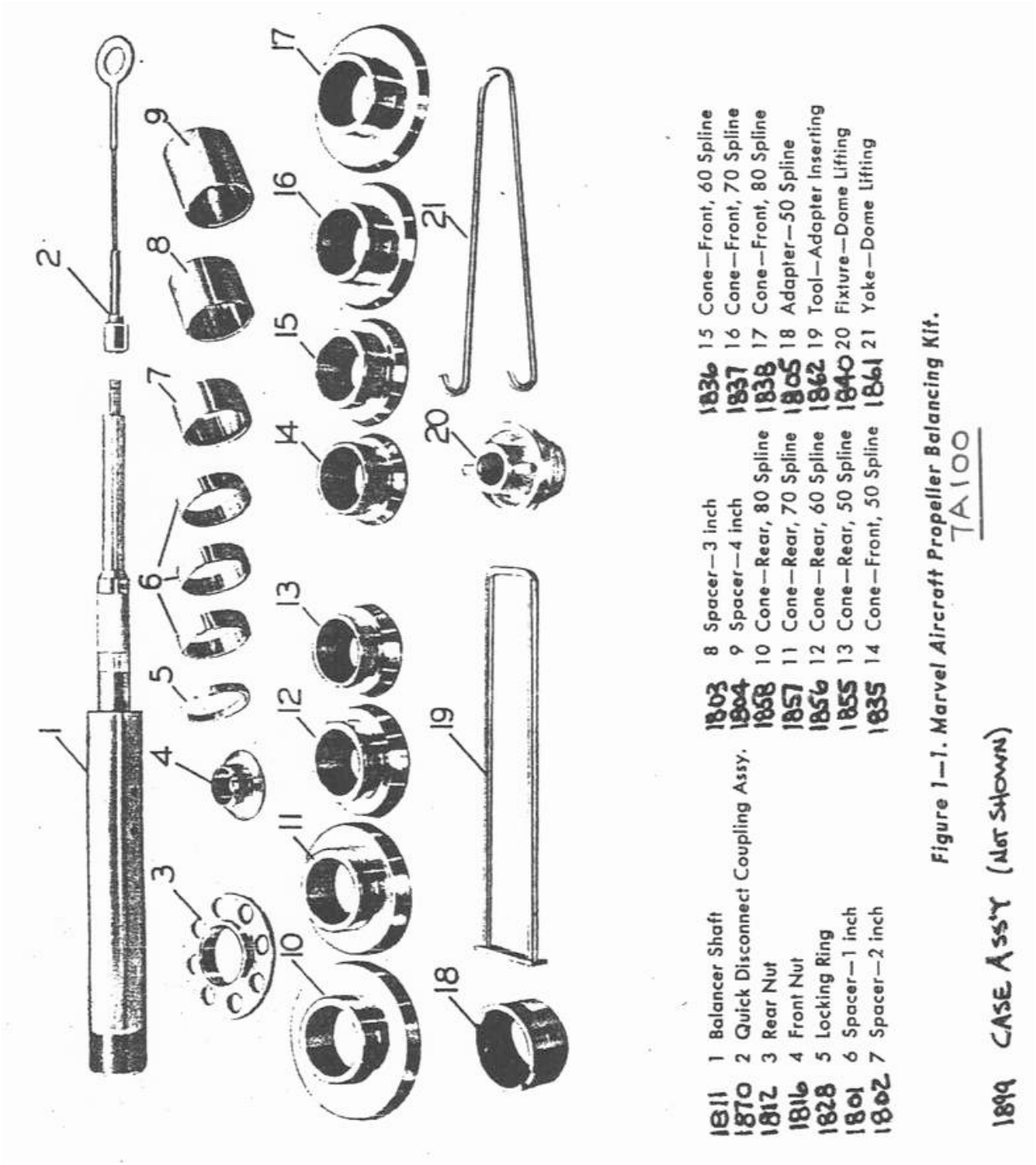
# Marvel

## Manufacturing Company

**40 North 2nd Street**
**Stroudsburg, PA 18360 USA**
**570-421-6221**

# Marvel Aircraft Propeller Balancer
# Horizontal Method - Suspension Type
# Bulletin No. 77



1811 1 Balancer Shaft
1870 2 Quick Disconnect Coupling Assy.
1812 3 Rear Nut
1816 4 Front Nut
1828 5 Locking Ring
1801 6 Spacer—1 inch
1802 7 Spacer—2 inch
1803 8 Spacer—3 inch
1804 9 Spacer—4 inch
1858 10 Cone—Rear, 80 Spline
1857 11 Cone—Rear, 70 Spline
1856 12 Cone—Rear, 60 Spline
1855 13 Cone—Rear, 50 Spline
1835 14 Cone—Front, 50 Spline
1836 15 Cone—Front, 60 Spline
1837 16 Cone—Front, 70 Spline
1838 17 Cone—Front, 80 Spline
1805 18 Adapter—50 Spline
1862 19 Tool—Adapter Inserting
1840 20 Fixture—Dome Lifting
1861 21 Yoke—Dome Lifting

*Figure 1—1. Marvel Aircraft Propeller Balancing Kit.*

TA100

1899 CASE ASS'Y (Not Shown)

# Section I
# Description

**1 – 1. GENERAL**

1 – 2. The Model 7A1000 Aircraft Propeller Balancer is manufactured by the Marvel Manufacturing Company, Caldwell, New Jersey. All parts are shown in Figure 1 – 1, facing page, except the balancing stand which is shown in Figures 1 – 5 and 1 – 6.

1 – 3. This equipment is designed to balance aircraft propellers weighing up to 2500 pounds, of 50 to 80 SAE spline size. It will also handle Hamilton Standard propellers, with dome assembly in place.

1 – 4. The Model 7A100 Balancer is of the suspension type and balances propellers in a horizontal position (*See Figure 1 – 2*). It is accurate to within a tolerance defined as 0.0005 inch times propeller weight. Sensitivity is extremely high and is controlled by positioning the propeller higher or lower on the shaft with respect to the balancer suspension point.

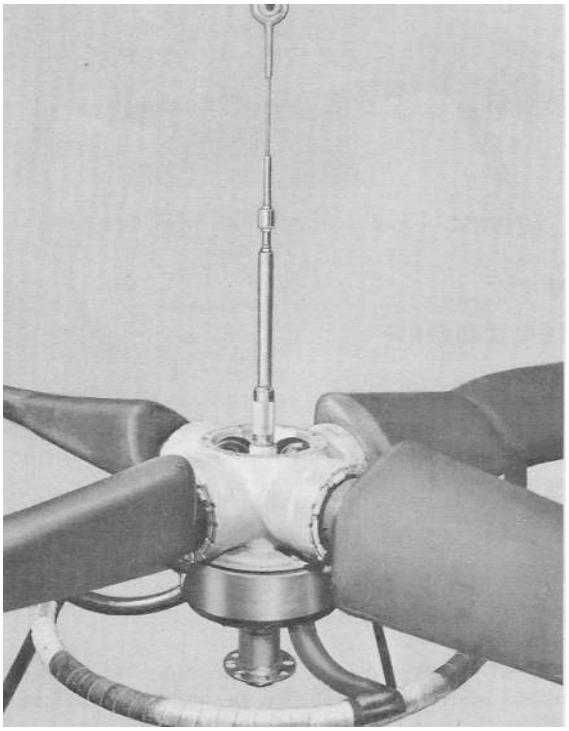


***Figure 1 – 2. Propeller suspended for balancing***

1 – 5. After the balancer has been properly installed and positioned in the propeller hub, the complete unit (balancer and propeller) is suspended from a hoist. Balance readings are obtained without rotating the propeller.

1 – 6. Balance readings are taken visually, direct from a circular indicator bushing above the top of the balancer shaft. When a propeller is balanced, this bushing is concentric with the black disc set in the end of the shaft. (*See Figure 1 – 3*.) When unbalanced, the bushing and disc are offset, indicating both the direction of unbalance and the amount of correction necessary. (*See Figure 1 – 4*).

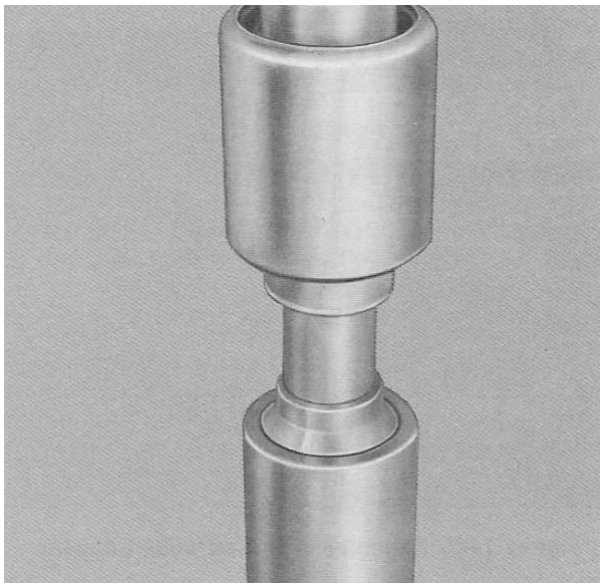


***Figure 1 – 3. Indicator bushing shows propeller perfectly balanced***

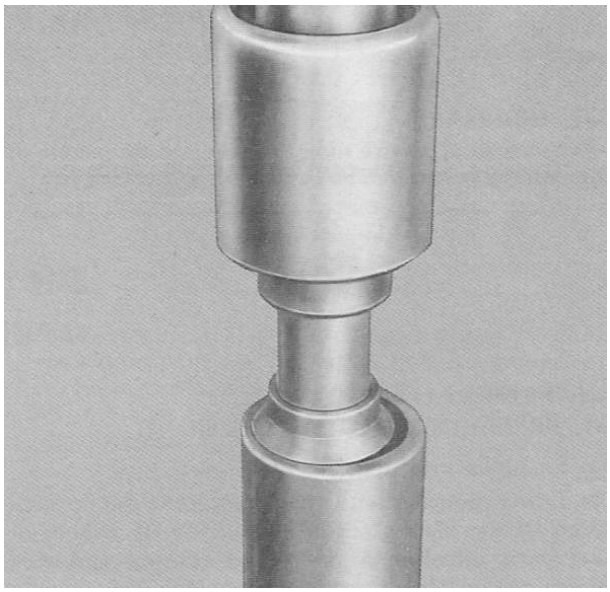


***Figure 1 – 4. Indicator bushing offset – propeller is unbalanced***

1 – 7. A balancer stand is used to support the propeller by the blades while installing the balancer. (*See Figure 1 – 5.*) When flanges or other components interfere, or to protect blade cuffs or anti-icing equipment, an adapter is used. In this case the propeller is supported on its hub. (*See Figure 1 – 6.*)

1 – 8. The complete balancer kit (*Figure 1 – 1)* contains a balancer shaft with suspension rod; quick disconnect assembly to suspend the unit; sets of front and rear cones; one-, two-, three-, and four-inch spacers to obtain proper vertical positioning of the propeller on the shaft; front and rear cone retaining nuts; front cone locking ring; dome lifting yoke and fixture; spline adapter and inserting tool.

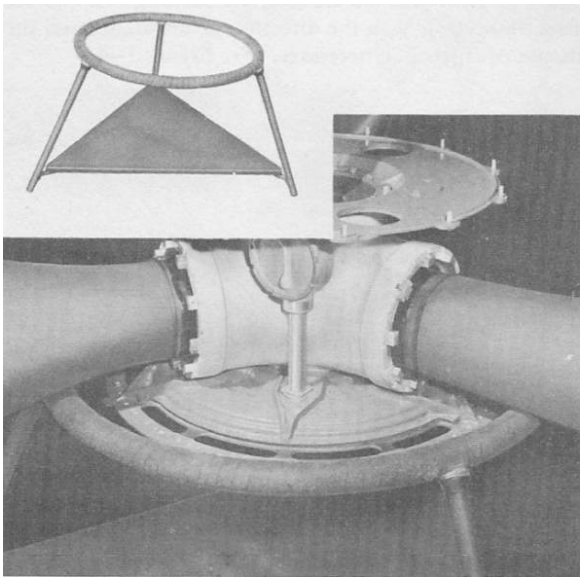


***Figure 1 – 5. Balancer stand without adapter***

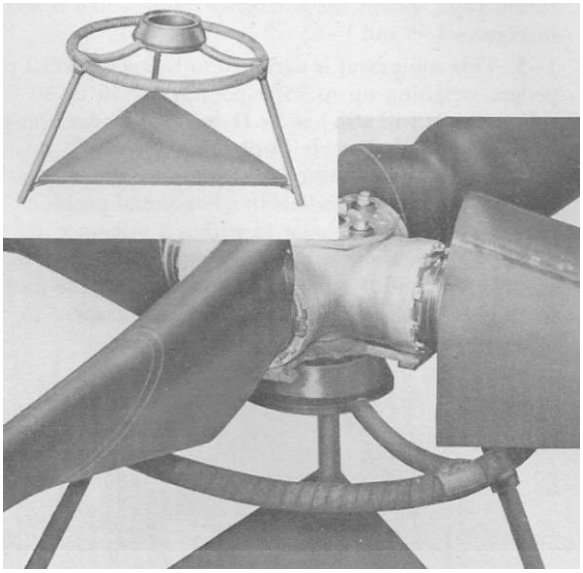


***Figure 1 – 6. Balancer stand with adapter***

# Section II
# Special Service Tools

**2 – 1. GENERAL**

2 – 2. No special service tools are required to operate or maintain the balancer. The balancer is a checking instrument having no moving parts subject to wear, or components requiring replacement.

# Section III
# Operation

**3 – 1. PREPARATION FOR USE.**

3 – 2. PREPARING THE PROPELLER.

a. Set up balancer stand.

b. Lower propeller onto stand, front cone seat up, supported by the blades. (*See Figure 1 – 5*). If flanges or other pars interfere, or to protect cuffs or anti-icing equipment, the adapter must be used. (*See Figure 1 – 6*). In this case the propeller will be supported on is hub.

c. Clean hub, front and rear cones. Apply a thin coating of any type of light, non-corrosive oil to cone seats.

d. Set all blades to the angle prescribed by overhaul manual covering the propeller. In most cases this angle will be 35 degrees plus or minus two degrees.

3 – 3. PREPARING BALANCER FOR USE.

a. Remove balancer shaft (*1, Figure 1 – 1*) from case carefully.

**CAUTION**

Do not lift by the suspension rod. Support the shaft by holding at butt end at knurled section above front threads.

b. Use a solvent, Federal Specification P-S-661B, to remove protective grease from suspension rod, indicator bushing, and top of balancer shaft.

c. Place balancer erect on a level floor and allow it to sit until is has reached room temperature, or 18° C (65° F) minimum. Allow at least ½ hour for the thick dampening oil to flow down into the sump.

d. Push the top of the suspension rod over until it touches the wall of the arbor. Release the rod and note the time required for the indicator bushing to come to rest in a concentric position. The floor must be level in order to obtain accurate readings. If the time interval is 3 to 5 seconds, the proper amount of oil is present.

e. To add oil it is necessary to first remove the indicator bushing. Release the bushing set-screw. Take care not to damage the sharp, beveled edges of the bushing. To assist in removing the bushing, insert 2 strips of shim stock (.002" - .003") under bushing on both sides of the rod and pull up while keeping strips taut.

f. Pour or squirt SAE 70 oil into balancer shaft. Approximately 2 fluid ounces (1/8 pint) are required if balancer is completely dry. Allow ½ hour each time after oil is added for it to settle before checking for the proper dampening interval.

***Figure 3 – 1. Squiring oil into balancing arbor***

**Note**

The viscosity, or thickness, of the oil used is the only important characteristic. Any type of non-corrosive oil with the proper viscosity may be used.

g. Reinstall indicator bushing on rod. Push bushing down over the rod and against two pieces of .002" - .003" shim stock or paper placed on both sides of the rod. Hold bushing firmly against shims in a concentric position, tighten set-screw, and then remove shims. To check for interference, push rod into each of 4 quadrants and make certain bushing returns to the center each time.

**Note**

Hereafter, balancer must remain in an upright position to prevent oil from running out. For shipping, cut a circular gasket with a hole in the center, out of a blotter to fit over the suspension rod. Remove indicator bushing, install gasket and bushing and sandwich the gasket tightly between end of shaft and bushing while tightening bushing set-screw.

h. Hold the balancer on the floor in an upright position and remove front nut (4, Figure 1-1). Clean nut and threads with solvent, then reinstall the nut with the large end facing down.

**Note**

In cleaning all parts, use dry cleaning solvent, Federal Specification P-S-661B. Never clean the shaft in a hot degreaser, as excessive heat may affect its accuracy.

i. Clean coupling assembly (2, Figure 1 – 1) and end of suspension rod. Connect the two in accordance with the instructions etched on the coupling assembly.

j. Lower hoist, insert in eye of coupling assembly, and raise balancer into air. Remove rear nut (3, Figure 1-1), loosen set screw in locking ring and remove locking ring (5). Remove all spacers from shaft. Clean all these parts.

k. Remove all parts from case and clean them of protective grease.

**CAUTION**

All working surfaces are unplated and will rust quickly if not protected. It is important to rub a film of heavy, clean, non-corrosive oil (S.A.E. 70) on all working surfaces of parts and balancer shaft.

3 – 4. SELECTING THE CORRECT PROPELLER SETTING MEASUREMENT.

a. In order to achieve the proper sensitivity, the balancer must be correctly positioned in the hub of the propeller. The correct positioning of the balancer depends on locating the front cone in the proper position on the balancer shaft. Obtain proper setting measurement for the front cone or adapter from Table 3-1.

## TABLE 3 – 1 SETTING MEASUREMENT

**Note**

Later changes in propeller models may affect the setting listed in this table. In such cases the balancer shaft should be raised or lowered in the propeller, as described in paragraph 3-16, until the proper setting is obtained.

### CURTISS

| Model | Setting (inches) | Model | Setting (inches) |
|---|---|---|---|
| C5132S-A2 | 13⅛ | C735S-A | 12¼ |
| C532SE-108 | 13¼ | C735S-A2 | 12¼ |
| C532SE-108 (836 blade) | 12¾ | C735S-A4 | 12¼ |
| C532SE-302 | 13⅛ | C735S-A8 | 12⅝ |
| C632S-A14 | 14½ | C736SP-A1 | 10⅛ |
| C632S-B2 | 14½ | C736SP-A3 | 10⅛ |
| C632S-B52 | 14½ | CT634S-E10, E2, E12 | 10 |
| C632SB-56 | 14¾ | (with power unit installed) | 12⅜ |
| C634D-A | 11¼ | CT735S-B102 | 10½ |
| C634S-C16 | 14¼ | CT735S-B104 | 10⅛ |
| C634SC-305 | 12¾ | C634S-C502 (858 blade) | 12 15/16 |
| C634S-C306 | 12¾ | C634S-C502 (830 blade) | 12⅞ |
| C634S-C314 | 12⅞ | C634S-C504 | 12¾ |
| C634S-C402 | 12⅞ | C634S-C510 | 12⅝ |
| C634S-C418 | 12 15/16 | C636SP-A21 | 10 |
| C644SB-312 | 12 | C636SP-A35R | 10⅛ |
| C644S-B316 | 12 | C644SA-22 | 12⅞ |
| C644S-B318 | 12 | C644SB-120 | 13 |
| C644S-B320 | 12 | C644S-B304 | 12⅛ |
| C644S-B364 | 12 | C644S-B306 | 12 |
| C645S-A2 | 11¼ | C644SB-310 | 11⅞ |

### AEROPRODUCTS

| Model | Setting (Inches) | Model | Setting (Inches) Using 1836 Cone | Using 1806 Adapter* |
|---|---|---|---|---|
| A542-A1 | 14 | A6341FN-D1 | 9⅞ | 12 27/32 |
| A542-B1 | 14 | A642-G | 13¾ | 16¾ |
| A542F-C1 | 14 | A644FN-C1 | 9¾ | 12 23/32 |
| AL542F-C1 | 14 | A644FN-C2 | 9¾ | 12 23/32 |
| A542F-D1 | 14 | AD8664FN—Outboard | 8 13/32 | 11⅜ |
| AL542F-D1 | 14 | —Inboard | 9½ | — |

*When using Adapter, Part number 1806 (Aeroproducts Part 6515310), insert the adapter into the propeller as described in paragraph 3-13 b and c and as illustrated in figure 3–13. The setting measurement in this case is measured up to the spacer as illustrated in figure 3–3A.

### HAMILTON STANDARD

| Model | Setting (Inches) With Dome | Without Dome | Model | Setting (Inches) With Dome | Without Dome |
|---|---|---|---|---|---|
| 23E50 | 14½ | 15½ | 34E60 | 10 | 11½ |
| 23260 | 12¾ | 14⅜ | 43D50 | 15½ | 16½ |
| 24D50 | 15 | 16¼ | | (Use 1805 Adapter**) | (Use 1805 Adapter**) |
| 24E60 | 14½ | 15½ | | | |
| 24F60 | 14½ | 15½ | 43E60 | 11 | 12 |
| 24260 | 12 | 13 | 43H60 | 10½ | 11½ |
| 33D50 | 14 | 15 | A3470 | — | 11¾ |
| 33E60 | 13¾ | 14¾ | | | (Use 1827 Adapter**) |
| | | | 54H60 | 8 1/2 | 9 1/8 |
| | | | 34660 | 9 3/4 | 10 1/4 |
| | | | 43E60 | 9 1/4 | 10 3/4 |

**When using Adapter, Part Number 1805 or 1827, insert the adapter into the propeller as described in paragraph 3–13 b and c and as illustrated in figure 3–13. The setting measurement in this case is measured up to the spacer as illustrated in figure 3–3A.

**Note**

If setting measurement for propeller model being balanced is not listed in Table 3-1, follow procedures outlined in paragraph 3-16.

b. Accurately measure the distance along shaft as shown in Figure 3–2. Take measurement from end of ground shaft, not from lower end of shaft threads. Mark this measurement on shaft.

**Note**

A scale will be etched on the balancing arbor, as shown in Figures 3–3 and 3–3A, on all arbors with the serial numbers above 700. The serial numbers will be found stamped on the butt end of the arbor.

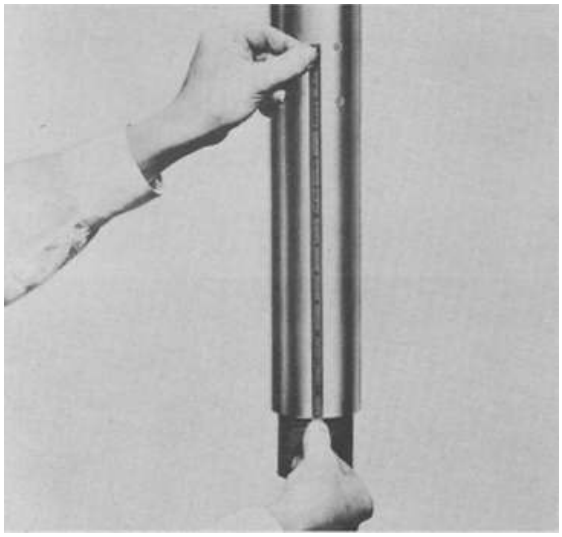


***Figure 3 – 2. Measuring the setting measurement***

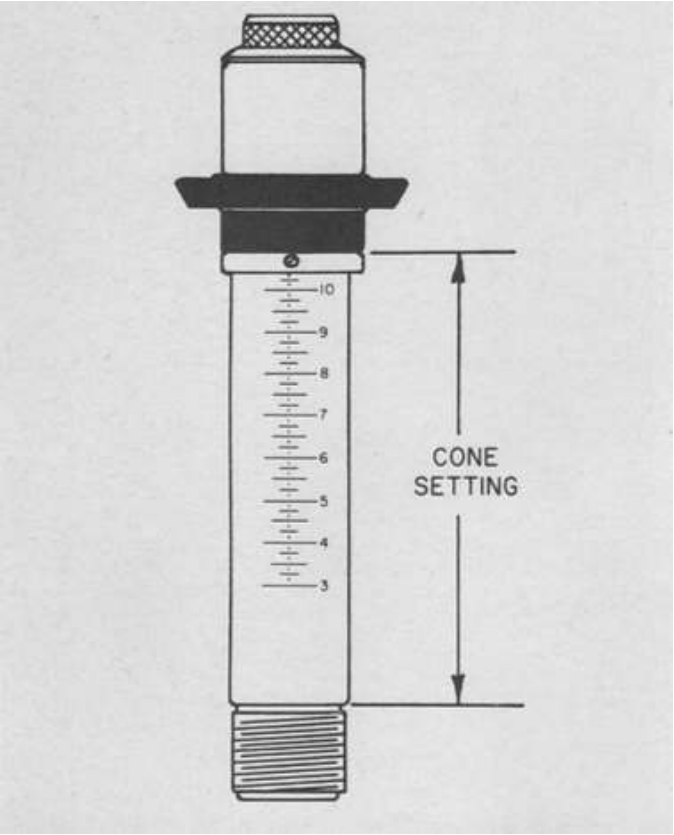



***Figure 3 –3. Balancer with front nut, spacer, front cone and locking ring in place***

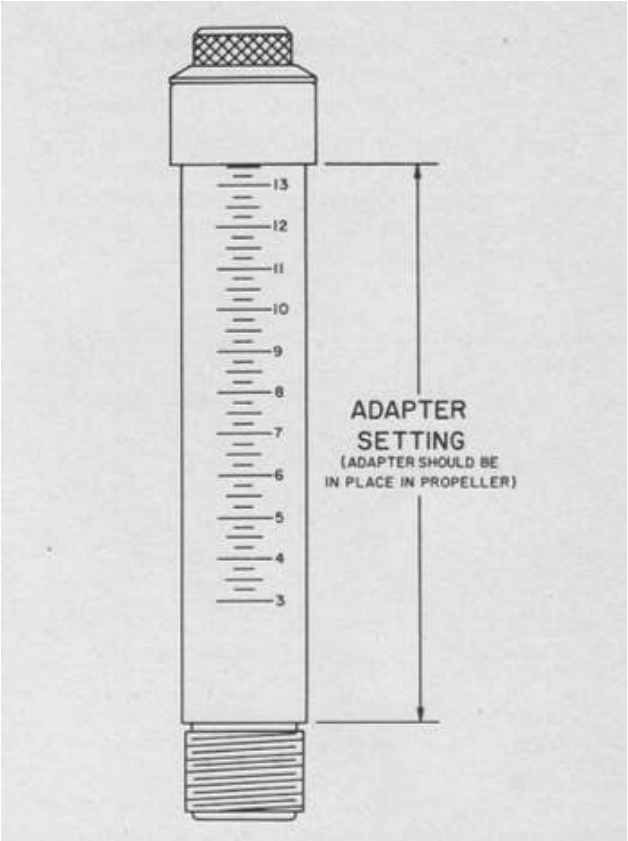



***Figure 3 –3A. Balancer with spacer and front nut in place just before lowering into propeller***

3 – 5. INSTALLING SPACERS, FRONT CONE, AND LOCKING RING.

a. Select applicable front cone (14, 15, 16, 17, Figure 1–1) of proper spline size of propeller to be balanced. Front cones are marked with spline size and “30° FRONT”.

b. Add spacer or spacers so that front nut will engage all its threads when front cone is properly located on the setting measurement.

c. Install spacer or spacers, then front cone, in this order, sliding them onto the shaft from the bottom.

**Note**

Always install and remove spacers, cones and locking ring from bottom of shaft.

d. The lower shoulder of the cone must align with the setting measurement. Adjust front nut to obtain final, accurate setting. Balancer will be partially assembled as shown in Figure 3–3.

e. Measure setting measurement again, and if accurate, add locking ring. Locking ring prevents front cone and spacers from sliding down shaft. Tighten locking ring set screw to secure ring.

3 – 6. INSERTING BALANCER SHAFT IN HUB.

a. Carefully lower partially assembled balancer shaft into propeller hub. Make sure front cone fully seats on hub cone seat. (See Figure 3–4.)

**Note**

In some model propellers it may be necessary to rotate the blades into feather position in order to prevent interference of cone with blade gear teeth.

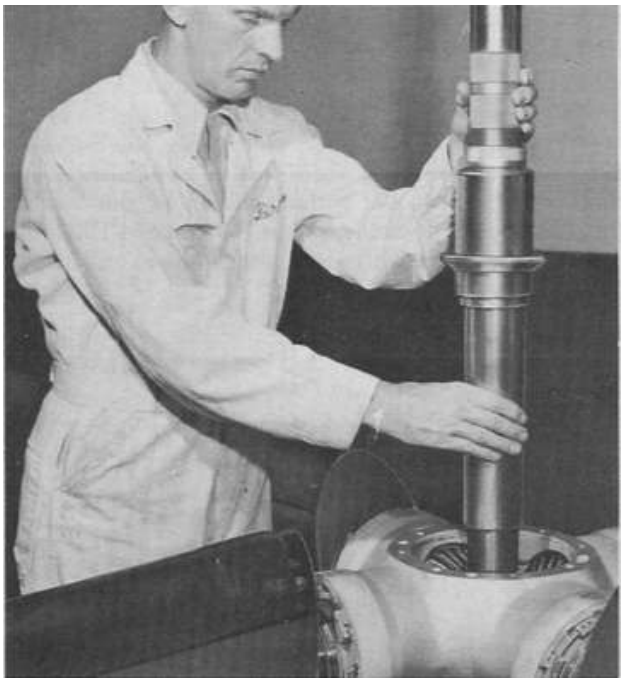


***Figure 3 – 4. Lowering balancer shaft into hub***

b. Slide proper size rear cone (*10, 11, 12, 13, Figure 1–1*) up shaft until it is fully seated against rear hub cone seat. Rear cones are marked with spline size and “15° REAR”. (*See Figure 3–5).*

c. Add spacers below rear cone so that rear nut engages all its threads when cone is securely seated. Tighten the nut with one hand, while holding the shaft from turning with the other.

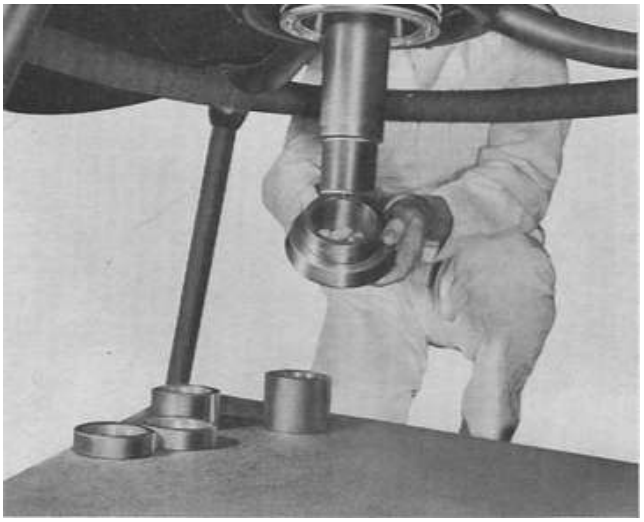


***Figure 3 – 5. Adding rear cone***

**3 – 7. OPERATING PROCEDURE.**

3 – 8. SUSPENDING PROPELLER AND OBTAINING BALANCE READINGS.

a. Hoist propeller one-half inch above balancing stand. One-half inch clearance is sufficient and will protect the balancer against shock if the propeller is bumped while the unit is suspended.

b. Damp out propeller oscillation by using the ring of the balancer stand or adapter as a hand rest, and cradling or steadying the propeller with finger tips. (*See Figure 3–6*).

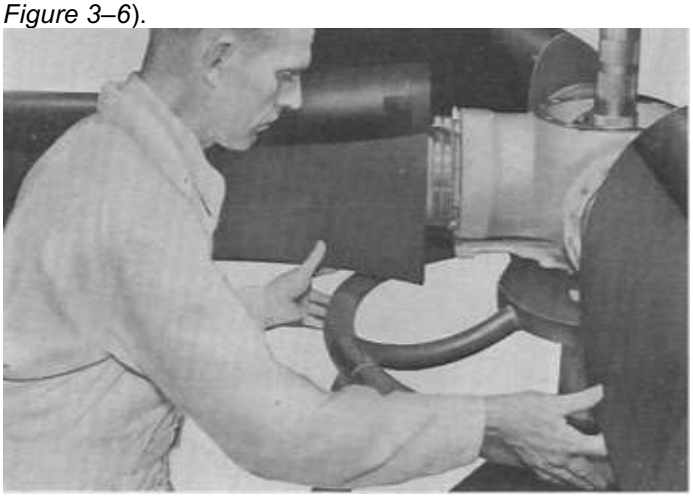


***Figure 3 – 6. Damping out propeller oscillation***

c. When all motion is stopped, note relationship of circular indicator bushing on suspension rod to black disc in end of balancer shaft. If they are concentric, propeller is perfectly balanced. If indicator bushing just touches the outside diameter of the disc, propeller is balanced within accepted tolerance. If indicator bushing overlaps the disc, propeller is out of balance and must be balanced as outlined in paragraph 3–9.

3 – 9. BALANCING PROPELLER

a. Apply temporary weights (lead wool, modeling clay, washers) as shown in Figure 3–7 to hub barrels until indicator bushing and black disc are concentric.

b. Slightly unbalanced conditions can be remedied by adding external balance weights to propeller. After balance has been obtained, these weights should be properly secured. (*See Figure 3–8*).

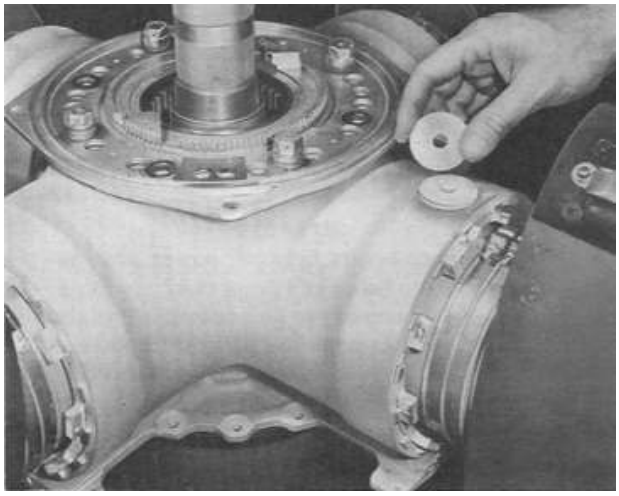


***Figure 3 – 7. Adding temporary balance weights***

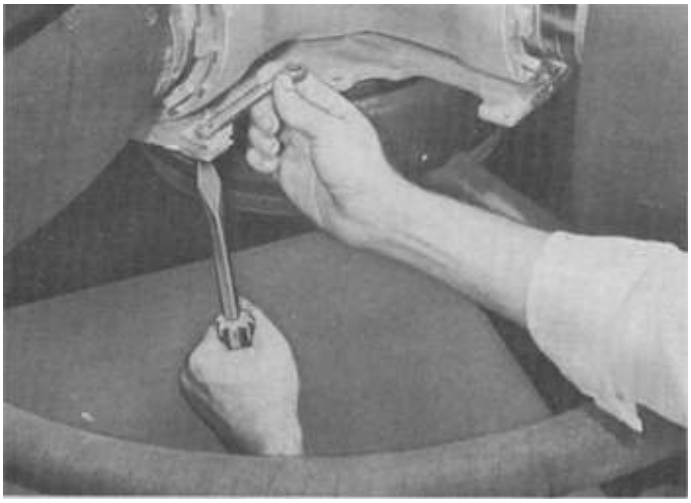


***Figure 3 – 8. Securing external balance weights***

**3 – 10. BALANCING VARIOUS PROPELLER MODELS.**

3 – 11. CURTISS PROPELLERS.

All models with a power gear assembly must be balanced with assembly installed. This is necessary to lock the blades at an angle of 35 degrees plus or minus two degrees.

a. Disconnect coupling assembly, remove from suspension rod, pass power gear over rod and balancer shaft.

b. Secure power gear assembly to hub face with three attaching bolts for three-bladed units, or four bolts for four-bladed units. Space bolts equally and use washers under bolt heads to keep bolts from bottoming in the holes. (*See Figure 3–9.*)

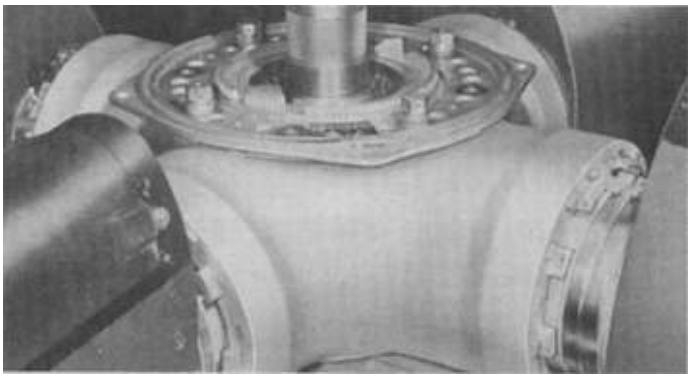


***Figure 3 – 9. Curtiss power gear assembly installed***

**Note**

If interference occurs between power gear assembly and the balancer's front cone retaining nut, it will be necessary to reduce over-all height of spacers between retaining nut and front cone. Select a different combination of spacers so that original spacer height is reduced one inch, and screw retaining nut down one inch. Make certain original setting measurement remains unchanged.

3 – 12. HAMILTON STANDARD PROPELLERS. All models must be balanced without electrical de-icer slip ring assembly or slinger ring assembly.

a. Balancer is designed to balance Hamilton Standard propellers with or without the dome in place. Since the additional mass of the dome will change the center of gravity of the propeller, there will be two balancer settings: one for propeller without the dome, and another for the complete assembly. Figure 3–10 shows Hamilton Standard propeller without dome in place, ready for balancing.

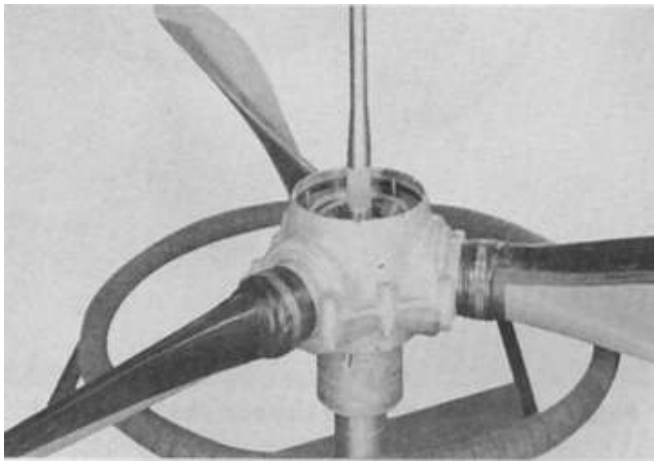


***Figure 3 – 10. Hamilton Standard propeller without dome in place***

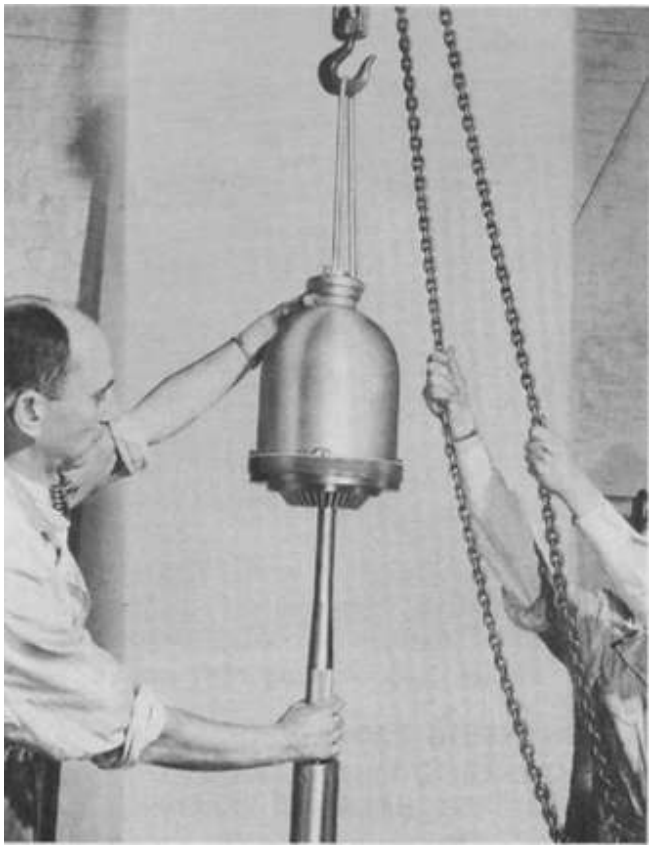


***Figure 3 – 11. Lowering Hamilton Standard dome into position***

b. If it is desired or required to balance propeller with dome assembly in place, balancer shaft should be set up with proper setting for dome balancing, and secured in propeller according to usual procedure. (If setting measurement is not shown in Table I, follow procedure outlined in paragraph 3–16). Coupling assembly should then be removed so that dome may be lowered over balancer shaft and into position on propeller. The universal dome lifting fixture (*20, Figure 1 – 1*) should then be screwed into dome assembly. Attach dome lifting yoke (*21, Figure 1–1*) to fixture, then hoist complete unit over top of balancer and lower into correct position on propeller. (*See Figure 3–11*.) Use dome nut wrench to tighten dome in place. Figure 3–12 shows propeller with dome in place, ready for balancing.

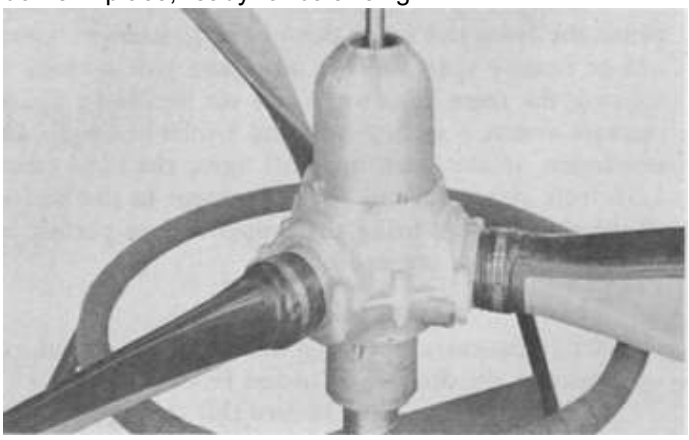


***Figure 3 – 12. Hamilton Standard propeller with dome in place***

3 – 13. SPECIAL 50 SPLINE ADAPTER.

a. Certain propellers, notably Hamilton Standard Model 43D50, must be assembled with their propeller shaft retaining nut and front cone in place. Therefore precision front cones of balancing kit cannot be used. Instead, a special 50 spline adapter (*18, Figure 1–1*) is supplied in the kit for use with these propeller models.

b. This adapter, with threaded end up, is placed on the inserting tool (19, Figure 1–1) provided in kit and inserted into propeller from the underside. (See Figure 3 – 13.) Grasp tool from top side of propeller and manipulate the adapter through front cone and into propeller shaft retaining nut. Screw adapter into nut for exactly the specified number of revolutions etched on adapter. Use shaft retaining nut wrench if necessary to prevent nut from rotating.

c. Lower balancer shaft into propeller through adapter, and follow normal procedure for assembly and operation.

**Note**

It is important to keep entire adapter well oiled at all times.

3 – 14. AEROPRODUCT PROPELLERS. All models must be balanced without the regulator, and without the accumulator if it is part of the installation.

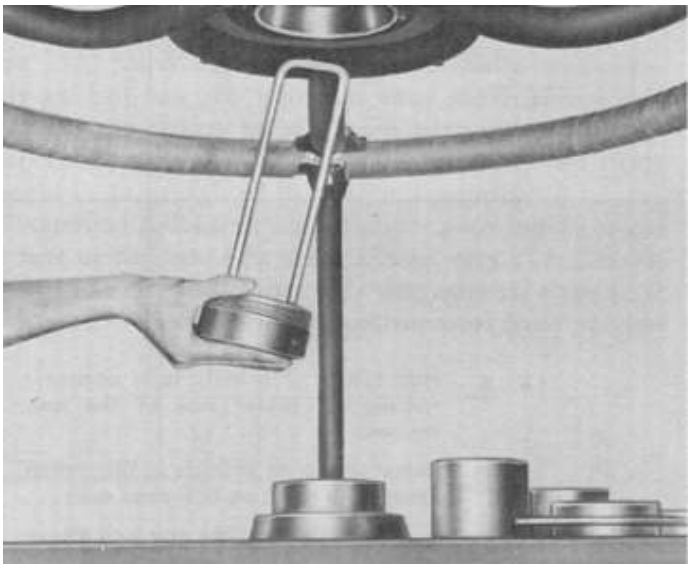


***Figure 3 – 13. Inserting 50 spline adapter***

3 – 15. REMOVING BALANCER FROM HUB.

a. When balancing is completed, lower propeller to balancer stand. Remove all balancer components in reverse of order assembled. Leave coupling assembly attached to hoist. Coat all mating surfaces of balancer with a permanent protective lubricant compound, exterior-surface, hard-film corrosion preventive. Specification AN-C-52b(1), if kit is to be stored. If balancer is used regularly, coat all mating surfaces with a light, clean, non-corrosive oil.

b. Replace spacers and locking ring on balancer shaft and add rear nut. Remove coupling assembly and place all parts in kit.

c. If kit is to be shipped, oil must be removed from shaft. Remove indicator bushing and lay shaft on an inclined surface with butt end raised. Allow oil to drain out completely.

3 – 16. HOW TO PROCEED WHEN SETTING MEASUREMENT IS NOT KNOWN.

a. The setting measurement controls the sensitivity of the balancer; therefore it is most important to get the balancer in the proper position in the hub. When balancer is in correct position, the top three set screws in the shaft will be about one inch above the center of gravity of the propeller. In most cases the propeller's center of gravity falls approximately on the center line of the hub barrels.

**Note**

Set screws are sealed over, but their location can be detected by indentations in the shaft.

b. Balancer sensitivity increases as the level of the top set screws approaches the center of gravity of the propeller. However, the top set screws must always be above the center of gravity of the propeller. A reading cannot be obtained if balancer is positioned with the top set screws below the propeller's center of gravity,

because the balancer shaft will lay against the suspension rod.

c. Insert balancer shaft in hub with front cone, suitable spacer, front cone retaining nut and locking ring installed so that the three top set screws are one inch above the center line of the blade assemblies. (*See Figure 3–14.).* Adjustment can be made by tightening or loosening the front cone retaining nut or adding or removing spacers. Add rear cone, spacers and rear nut so that all its threads are engaged. Tighten rear nut with one hand, holding shaft from turning with the other.

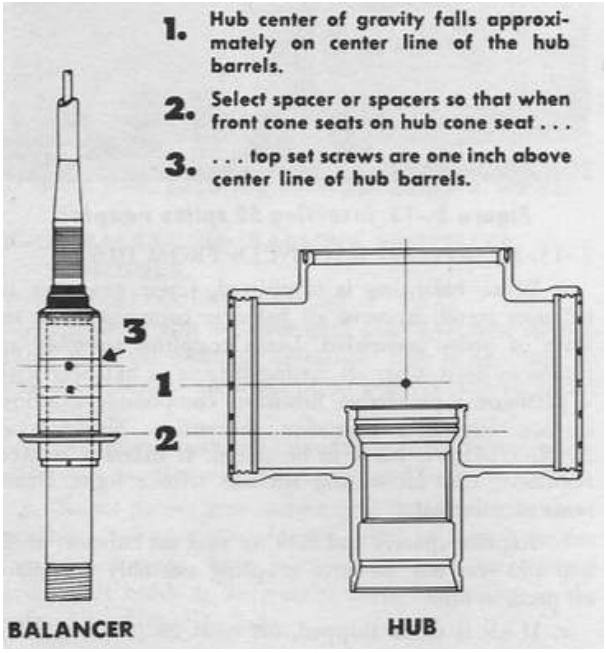



***Figure 3 – 14. Positioning balancer in hub when setting measurement is not known***

d. Hoist entire assembly one-half inch off stand. Damp out all movement. Observe relationship of circular indicator bushing to black disc set in shaft. Propeller will probably be unbalanced as in Figure 1–4. Add temporary weights to bring into perfect balance as shown in Figure 1–3.

e. Place either a half-dollar, two quarters, or a half-ounce weight on any blade at the following distance from the center of the hub:

24 inches for propellers weighing 1500 pounds
20 inches for propellers weighing 1250 pounds
16 inches for propellers weighing 1000 pounds
12 inches for propellers weighing 750 pounds
8 inches for propellers weighing 500 pounds
4 inches for propellers weighing 250 pounds

**Note**

If propeller specifications specify 0.001 inch times propeller weight as the balance tolerance, then distances as listed above must be doubled; that is, 48 inches for propellers weighing 1500 pounds, 40 inches for propellers weighing 1250 pounds, etc.

f. Placing of this weight on the blade will offset the bushing and the black disc. If the weight offsets the indicator bushing to the perimeter of the black disc, as shown in A of Figure 3–15, the balancer is correctly positioned, and the balancing procedure may be continued.

g. If the half-ounce weight moves to the bushing beyond the perimeter of the black disc, as shown in C of Figure 3–15, it means the balancer is too sensitive; therefore the front cone must be moved down the shaft.

h. If the half-ounce weight fails to move the bushing to the perimeter of the black disc, as shown in B of Figure 3–15, the balancer is not sensitive enough, necessitating moving the cone up the shaft.

i. For slight upward or downward movements, simply adjust the front nut up or down. For greater movement, add or remove spacers. This procedure will provide for locating the front cone anywhere on the shaft. Spacers measure 4 inch, 3 inch, 2 inch and 1 inch in length. One revolution of the front nut will move the cone exactly 1/16 inch. After making any adjustment in the position of the cone, always bring the propeller into perfect balance again before proceeding.

**Note**

When the correct position has once been found, measure the distance in inches from the bottom of shaft to front cone. Record this setting measurement in Table I for future use.

j. After the correct position has been found, follow the usual procedure as outlined in paragraph 3–6 (b) through 3–9.

3 – 17. SPECIAL USE OF CARRYING CASE

a. The carrying case is also designed to serve as a

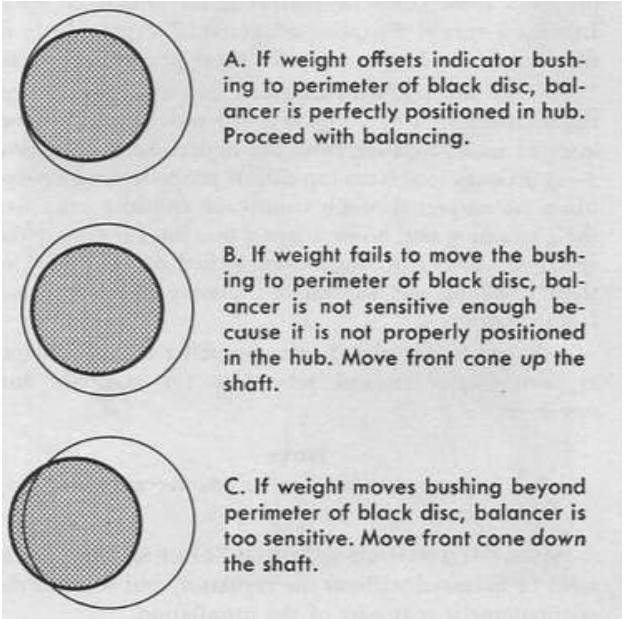



***Figure 3 – 15. How to interpret indicator readings***

working case. See Figure 3 – 16 for mounting instructions.

b. When serving as carrying or shipping case, there is ample room for the shaft, completely assembled with any size front cone, spacers and locking ring. The shaft is now ready for use.

**CAUTION**

When transporting the kit, make certain all parts are properly placed and secured, to prevent loose parts from causing damage.

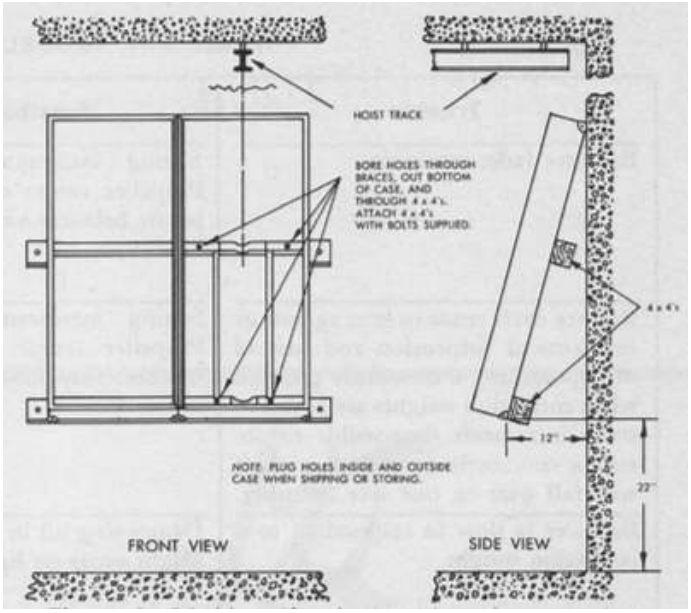



***Figure 3 – 16. Mounting instructions for carrying case***

# Section IV
# Inspection and Lubrication

**4 – 1. INSPECTION.**

4 – 2. Visually inspect the balancer shaft, front and rear cones, and all spacers before each balancing operation. Examine all mating surfaces closely. Be careful not to damage these surfaces.

**CAUTION**

The 7A100 balancer will give consistently accurate readings unless suspension rod is damaged or six set screws which position rod in shaft have been tampered with. These screws must not be removed or adjusted. If rod must be replaced or set screws adjusted, balancer must be returned to the manufacturer.

**4 – 3. LUBRICATION.**

4 – 4. If balancer is used regularly, coat the balancer shaft and all ground mating surfaces with any light, clean, non-corrosive oil after balancing operations. If kit is to be stored, or is used only periodically, use hard-film, exterior-surface corrosion preventative compound, Specification AN-C-52b(1).

# Section V
# Maintenance

**5 – 1. GENERAL.**

5 – 2. The 7A100 does not require maintenance as there are no moving parts. All spacers and cones are case hardened. Their placement on the shaft and their removal does not subject them to wear. Should the balancer fail to react properly, after being suspended, refer to Trouble Shooting Chart, Table 5 – 1.

**Table 5 – 1. Trouble Shooting Chart**

| Trouble | Possible Cause | Remedy |
|---|---|---|
| Balancer lacks sensitivity. | Setting measurement not correct. Propeller center of gravity too far below balancer suspension point. | For minor adjustments, back off front nut, thus lowering shaft (and suspension point). For major adjustments, remove spacer or spacers below front nut, thus lowering shaft. |
| Balance shaft tends to lean against or roll around suspension rod instead of approaching a concentric position when correction weights are added in small increments. Impossible to obtain a concentric condition – shaft will fall over to one side or other. | Setting measurement not correct. Propeller center of gravity above balancer suspension point. | Reverse the above remedy. |
| Balancer is slow in responding to a correction weight. | Dampening oil in shaft is too heavy. Might occur on light propellers. | Remove and replace with a lighter oil. (It may take as long as 15 minutes for a heavy oil to drain out completely.) |
| Balancer seems unusually responsive and tends to oscillate for a considerable length of time before coming to rest. | Dampening oil in shaft is too light. Might occur on light propellers. | Remove and replace with a heavier oil. (It may take as long as 15 minutes to pour or feed in heavy oil; air bubbles will rise through the oil very slowly.) |
| | Interference from drafts or air currents caused by persons walking too close to blade tips. | Isolate from air disturbances. |
| Balancer seems to catch or lock in various positions. | Physical interference between end of shaft and indicator bushing. | Loosen bushing and raise enough to allow a 0.002 inch – 0.003 inch gap. Retighten bushing. |
| Readings erratic. | Suspension rod set screws tampered with or removed. | Refer to paragraph 4–2. |
| | Cones improperly seated. | Remove balancer from propeller and clean cone seats in propeller and cone faces on cones. |
| | Cone seats nicked. | Use stone, Emery paper and Crocus cloth to remove nicks. (Use Hard Arkansas stone or equal, 3/0 Emery paper and Crocus cloth). |