



# SERVICE BULLETIN

No. 470

Piper Aircraft Corporation

Lock Haven, Pennsylvania, U.S.A.

"DOA EA-1 Approved"

October 27, 1975 M

Subject:

Propeller Feather Assist Spring Assembly Installation, reference attached Hartzell Service Bulletin No. 111, dated June 12, 1975.

Models Affected:

PA-31P Navajo

Serial Numbers Affected:

31P-1 to 31P-7530018 Inclusive, 31P-7530021, 31P-7530026

Compliance Time:

Refer to attached Hartzell Service Bulletin No. 111, Required Action section.

Purpose:

To provide distribution of Hartzell Service Bulletin No. 111, dated June 12, 1975, 1975 which announces availability of a Propeller Feather Assist Spring Assembly Installation Kit for the above referenced aircraft. The advantages of this installation are specified in the Discussion section of the attached Hartzell Service Bulletin No. 111.

Instructions:

Installation instructions for Hartzell Kit No. A-1588 Propeller Feather Assist Spring Assembly Installation are contained in Hartzell Instruction No. 102, dated June 12, 1975, copies of which have been provided to all Piper field service facilities.

NOTE:

This installation must be conducted by a qualified propeller repair station (with facilities and tooling available to ascertain correct blade angles and insure proper propeller operation). A listing of qualified propeller repair stations is attached to this bulletin to assist Pressurized Navajo owners/operators in locating the nearest facility.

Material Required:

One (1) each per propeller Hartzell Kit No. A-1588, Propeller Feather Assist Spring Assembly Installation.

Availability of Parts:

Material procurement may be arranged through your Piper field service facility.

(over)

Effectivity Date:

This Service Bulletin is effective upon receipt.

Summary:

Please contact your Piper field service facility to make arrangements for compliance with the provisions of this service release. It is strongly recommended that this product improvement feature be incorporated in your aircraft at the next inspection/maintenance interval (not to exceed the next scheduled prop overhaul interval). Installation of this item at an inspection/maintenance interval will assist in minimizing down time and labor expense. Affected owners/operators may recoup required material expense (one each per propeller Hartzell kit A-1588 @ \$55.00 per kit) through submittal of a Product Condition/Compliance Report form through your Piper field service facility.

The installation can be accomplished with the propellers on the aircraft, encompassing approximately one to two hours per propeller.

# Hartzell • PROPELLER, INC.

AREA CODE 513  
TELEPHONE 773-7413  
TELEX 288039



*Manufacturers of Airplane Propellers*  
350 WASHINGTON AVE

**PIQUA, OHIO 45356**

BULLETIN NO. 111

DOA-FAA Approved

June 12, 1975

Subject: Availability of a Feather Assist Spring Assembly Kit, Part No. A-1588

Effectivity: All Hartzell Model HC-C3YN-2L/JC9684B-3R and HC-C3YN-2LF/FJC9684B-3R (deicing) or HC-C3YN-2LA/JC9684-3R and HC-C3YN-2LAF/FJC9684-3R (non-deicing) propellers installed on Piper PA-31P aircraft.

Discussion: The propellers installed on this aircraft have a system in which blade counterweights and air pressure in the cylinder are utilized to increase pitch and feather the propeller, opposed by governor regulated oil pressure to reduce pitch.

To avoid the possibility of an unstable force at high airspeeds when the propeller air charge is at zero, a spring is now being incorporated in the air chamber. This spring will produce sufficient force to operate the propeller in normal flight conditions, and also produce sufficient force to feather the propeller. The air charge will be reduced by the equivalent amount of the spring force.

Required Action: Instructions for emergency operation with zero air charge in the propeller are given in Hartzell Service Instructions No. 99 and Piper Service Bulletin No. 458.

It is recommended that the feather assist spring kit be installed at the next most convenient time, but no later than the 1000 hour overhaul time period. The feather assist spring kit must be installed in both propellers by a qualified propeller repair station to assure proper reassembly. See Hartzell Service Instructions No. 102 for the installation procedure.

Required  
Action  
(Cont'd):

The propeller model will become HC-C3YN-2LU/JC9684B-3R or HC-C3YN-2LUF/FJC9684B-3R (deicing) or HC-C3YN-2LAU/JC9684-3R or HC-C3YN-2LAUF/FJC9684-3R (non-deicing) when this kit is installed.

An entry of the compliance with this service bulletin shall be made in the aircraft or propeller log book.

Publications  
Affected:

This service bulletin will become part of Hartzell Overhaul Manual 117D and must be considered part of the overhaul procedures.

HARTZELL DISTRIBUTORS  
(Domestic)

May 5, 1975

Aero Propeller, Inc.  
120th at Kipling  
Jefferson County Airport  
Broomfield, Colorado 80020

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Phone: AC 303 469-1749

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P. O. Box 72, Building 209  
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Opa Locka, Florida 33054

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Phone: AC 305 688-9439

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4021 West Cayuga  
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AC 602 955-3385 (After 5)

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AC 919 767-5100

Piqua Aircraft Company  
Box 358  
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Attn: Jean Victor  
Phone: AC 513 773-3520

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Phone: AC 303 364-7661

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Houston, Texas 77012

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Page Three  
May 5, 1975

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7785 San Fernando Road  
Sun Valley, California 91352

Attn: Keith W. Bailey  
Phone: AC 213 875-0785  
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Western Airmotive Company, Inc.  
Oakland International Airport  
Hangar 7  
P. O. Box 2445  
Oakland, California 94614

Attn: Lynn Zackowitz  
Phone: AC 415 635-2829

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Chicagoland Airport, Hangar 3  
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Prairie View, Illinois 60069

Attn: Arthur Mueller  
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May 5, 1975

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Richmond, British Columbia  
Canada V6X 1X5

Attn: Fred Sebus  
Phone: AC 604 273-4561  
AC 604 273-4562

Leavens Service & Overhaul Ltd.  
2555 Derry Road East  
P. O. Box 1000  
Malton Postal Station  
Mississauga, Ontario, Canada L4T 1A1

Attn: R. H. Leavens  
Phone: AC 416 678-1234

Western Propeller Co., Ltd.  
Hangar #16  
Industrial Airport  
Edmonton, Alberta, Canada T5G 2Z4

Attn: Gary Sloane  
Phone: AC 403 452-0657



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Fornebu Airport, Norway



*Manufacturers of Airplane Propellers*  
350 WASHINGTON AVE

**PIQUA, OHIO 45356**

INSTRUCTIONS NO. 102

June 12, 1975

## Installation Instructions for the A-1588 Feather Assist Spring Assembly Kit

The purpose of these instructions is to acquaint the mechanic with the procedures employed to disassemble, modify, and reassemble the Hartzell propeller in the process of incorporating the A-1588 feather assist spring assembly kit. This installation must be accomplished only by an FAA approved repair station, with facilities and tooling available to ascertain correct blade angles and assure proper propeller operation.

### Disassembly Instructions

Feather propeller prior to engine shutdown.

Remove AN526C1032 screws securing the spinner end cap. Remove pressure chamber decal inside the spinner end cap.

Remove valve cap and release all air in propeller cylinder.

Remove A-2405-( ) check nut, being sure A-2404-( ) low pitch stop does not move.

Remove main spinner shell.

Loosen the A-2405 check nut and remove A-2404 low pitch stop.

Remove and discard A-3205 Nyloc socket head cap screw.

- a) Count and record number of A-2435-( ) washers between the A-2411-1 feathering stop washer and the A-2499-( ) sleeve.
- b) Count and record the number of A-2435-( ) washers between the A-2499-( ) sleeve and the B-2491-( ) rod.

Using Hartzell Tool BT-2801 or equivalent, remove B-2423-1 cylinder and remove PRP-914-17, PRP-909-25, and A-3223 "O" rings and discard.

Remove four each AN501A416-10 screws attaching 830-30 auto high pitch stop unit and discard four screws and stop unit.

June 12, 1975

Assembly Instructions

Install B-1593 high pitch stop bracket into cylinder with four each AN501A416-10 screws. Use one drop of Loctite "H" on each screw and torque screws to 2 ft. lbs.

Turn four AST-2854 rods into the B-1593 high pitch stop bracket.

Install A-3223 "O" ring in cylinder.

Install Hartzell Tool BT-2801 on the B-2423-1 cylinder. (Original BT-2801 tool will have to be modified to accept the AST-2851 bushing of the BST-2853 assembling tool.)

Place B-1594 feathering spring in B-2423-1 cylinder onto B-1593 high pitch stop bracket.

Place B-1592 spring retainer into B-1594 feathering spring.

Remove the 5/16-24 nuts and AST-2852 drilled washer from BST-2853 assembling tool.

Pass BST-2853 assembling tool through the cylinder spring assembly.

Wrap A-1596 high pitch stop spring around two A-1590 high pitch stop weights when connecting the spring. Close both ends of spring securely. Apply a light coat of grease to the side of the weights that contact the B-1593 high pitch stop bracket.

Place A-1590 high pitch stop weight into B-1592 retainer around BST-2853 assembling tool.

Install AST-2852 washer and the two 5/16-24 nuts on BST-2853 assembling tool, and two 1/4-20 nuts on AST-2854 rod protruding through smaller holes of the AST-2852 washer.

Draw the threaded rod section through assembly by tightening the 5/8-11 hex nut. Do not exceed 10 ft. lbs. of torque. Remove the two AST-2854 rods from assembly without the 1/4-20 nuts.

Install two A-1595 shoulder screws with one drop of Loctite "H" through A-1590 weight. Torque screws to 4 ft. lbs.

Remove the remaining two AST-2854 rods from the assembly.

Back off the tension on the BST-2853 assembly tool enough to rotate the AST-2852 washer 90 degrees.

Install two each A-1595 shoulder screws with one drop of Loctite "H" through A-1590 weight. Torque screws to 4 ft. lbs.

Remove the two 5/16-24 nuts and AST-2852 washer from BST-2853 assembly tool. Remove BST-2853 tool from assembly.

Install decal HI-102 on the inside wall area of the B-1592 spring retainer.

Place A-1591 spring guide into B-3237 piston.

Assembly Instructions (Cont'd)

Add 0.1 of a pound of MIL-H-5606A-AM2 hydraulic fluid or equivalent in the piston chamber prior to installation of cylinder.

Install PRP-909-25 "O" ring in the groove on hub at the thread. Apply an even coat of RTV 732 to the "O" ring.

Rotate blades into feathered position.

Place A-2499-( ) high pitch stop sleeve with A-2435 or A-2435-1 washers in place on the B-2491-( ) rod.

Place the cylinder assembly into position over B-2491-( ) rod and A-2499-( ) high pitch stop sleeve.

Thread BST-2853 tool through BT-2801 into B-2491-( ) pitch change rod. Draw the cylinder assembly onto the hub threads by tightening the 5/8-11 hex nut. Screw the cylinder onto the hub by using the BT-2801 wrench. Be sure to tighten 5/8-11 hex nut enough to allow cylinder to engage several hub threads. Remove BST-2853 tool and torque cylinder to 120 to 150 ft. lbs.

Make a trial setting of the feathering stop by first assembling A-2411-1 feathering stop washer and A-3205 cap screw without A-2435 or A-2435-1 washers. Check the feathering angle. If the angle must be increased, add A-2435 or A-2435-1 washers under the A-2411-1 feathering stop washer. A movement of .028 inch at the rod represents 1° blade angle change.

Unfeather the blades with air pressure applied through the B-2491-( ) rod.

Install PRP-914-17 "O" ring into cylinder.

Install A-2404-1 low pitch stop and A-2405 nut. Adjust to obtain low blade angle. Torque A-2405 nut to 30 ft. lbs.

Check blade movement between the low stop and high stop. This is generally held to a range between 4° and 8°. If this is not correct, adjust position of A-2499-( ) sleeve by shifting washers.

#### CAUTION

Before removing A-3205 cap screw or readjusting the A-2499-( ) sleeve position, adequate control of the piston must be assured using air or blade paddles providing controlled movement into feather.

The total space between the A-2411 feather stop washer and end of B-2491-( ) rod must not be altered by adjusting washers in the A-2499-( ) sleeve. A change in the feather position will occur if altered.

Assembly Instructions (Cont'd)

Install the A-3205 cap screw with one drop of Loctite "H" on the screw. Tighten screw as much as possible with the Allen head wrench.

Charge the cylinder through valve with dry air or nitrogen gas to the pressure indicated on Decal Part No. CRP-41.

Install Decal Part No. CRP-41 on outer surface of B-2423-1 cylinder.

Test for leakage by using a soap solution or equivalent around valve, stop, and rear end of tube. Restamp hub model number as per assembly drawing.

Reinstall spinner assembly and place Decal Part No. CAU-002 in the area on the spinner adjacent to the #645 air valve.

Reinstall the spinner end cap.

NOTE: If propeller is to be installed, follow instructions as per the appropriate owner's manual.

Attachments:

- Drawing B-1589, Feather Assist Spring Assembly
- Drawing A-1588, Feather Assist Spring Assembly Kit
- Drawing BST-2853, Assembling Tool
- Drawing BT-2801, Tool
- Diagram of Feathered Assembly
- Diagram of Unfeathered Assembly

DATE	CHECK
5-2-75	WHL

A-1588

A-1588 FEATHER ASSIST SPRING ASSEMBLY KIT

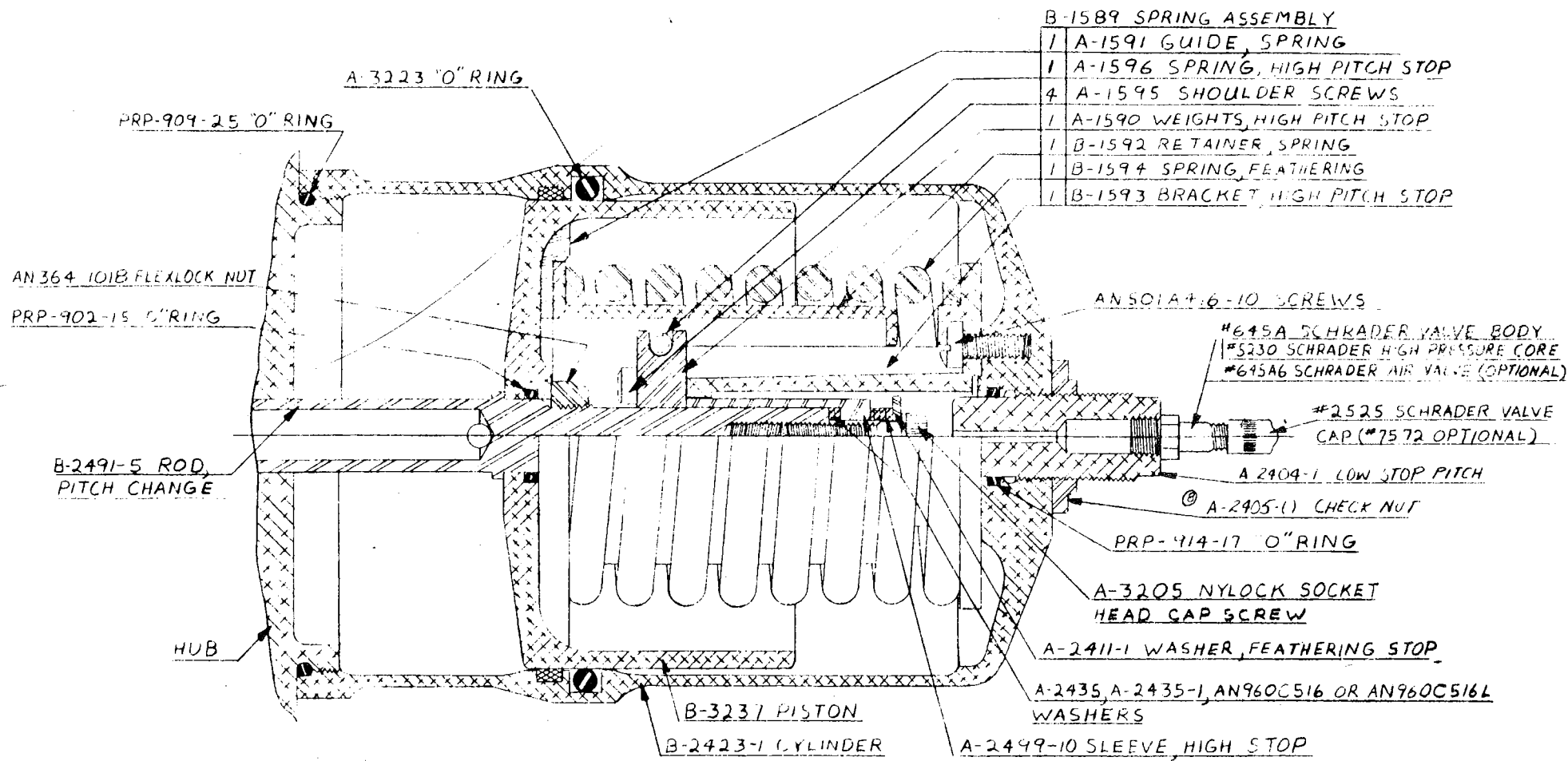
NUMBER OF PARTS REQUIRED	1	B-1589 SPRING ASSEMBLY, FEATHER ASSIST
	1	A-1591 GUIDE, SPRING
	1	A-1596 SPRING, HIGH PITCH STOP
	4	A-1595 SHOULDER SCREWS
	1	A-1590 WEIGHTS, HIGH PITCH STOP
	1	B-1592 RETAINER, SPRING
	1	B-1594 SPRING, FEATHERING
	1	B-1593 BRACKET, HIGH PITCH STOP
	4	AN501A416-10 SCREWS
	1	PRP-914-1 "O" RING
	1	A-3205 NYLOCK SOCKET HEAD CAP SCREW
	1	A-2411-1 WASHER, FEATHERING STOP
	4	A-2435 OR AN960C516 WASHERS
	4	A-2435-1 OR AN960C516L WASHERS
	1	PRP-909-25 "O" RING
	1	A-3223 "O" RING
A	1	HI-102 DECAL
B	1	CPR-41 DECAL
C	1	CAU002 DECAL

DO NOT SCALE DWG. REPORT ANY CHANGES	~	~	~	~	E. J. 5-2-75	WBL	5-2-75	REPLACES	REPLACED BY	SCALE ~	NO. REQ'D.
	MATERIAL	HEAT TREAT	FINISH	WEIGHT	DRAWN	CHECKED	APPROVED				
HARTZELL PROPELLER INC. PIQUA, OHIO		FEATHER ASSIST SPRING ASSEMBLY KIT									

TOLERANCES  
 FRACTIONS  $\pm 1/32$   
 DECIMALS  
 .00  $\pm .000$   
 .000  $\pm .010$   
 .0000  $\pm .0005$   
 ANGLES  $\pm 1/4^\circ$   
 UNLESS OTHERWISE NOTED

A-1588

B 6851-8



B	A 2405-1 CHECK NUT ADDED	5-28-75	WBA
A	FEATHERING ASSEMBLY, FEATHER ASSIST WAS FEATHERED	5-28-75	WBA
LET	CHANGE	DATE	CHECKER

DO NOT SCALE DWG. REPORT ANY CHANGES	MATERIAL	HEAT TREAT	FINISH	WEIGHT 3.6 LBS INCREASE	DRAWN E.J.	CHECKED 4-24-75	APPROVED WBA	REPLACES	REPLACED BY	SCALE	NO. REQ'D	TOLERANCES FRACTIONS DECIMALS ANGLES UNLESS OTHERWISE NOTED
HARTZELL PROPELLER INC. PIQUA, OHIO				FEATHERING ASSEMBLY, FEATHER ASSIST								±1/2 ±.030 ±.010 ±.0085 ±1/16° 5/16" 433/64"
											B-1589	

7/RAF

LET.	CHANGE	DATE	CH	ER

AST-2855

# AST-2855 TOOL KIT

1	BST-2853 ASSEMBLING TOOL
4	AST-2854 RODS
2	1/4-20 UNC-3B FULL HEX HEAD NUTS
1	BT-2801 WRENCH FOR MOUNTING CYLINDER

DO NOT SCALE  
DWG. REPORT  
ANY CHANGES

MATERIAL

HEAT-TREAT

FINISH

WEIGHT

DRAWN

CHECKED

APPROVED

HARTZELL  
PROPELLER INC.  
PIQUA, OHIO

## TOOL KIT

TO ASSEMBLE AND INSTALL B-1584  
FEATHER ASSIST SPRING ASSEMBLY

REPLACES

REPLACED BY

SCALE

NO. REV'S.

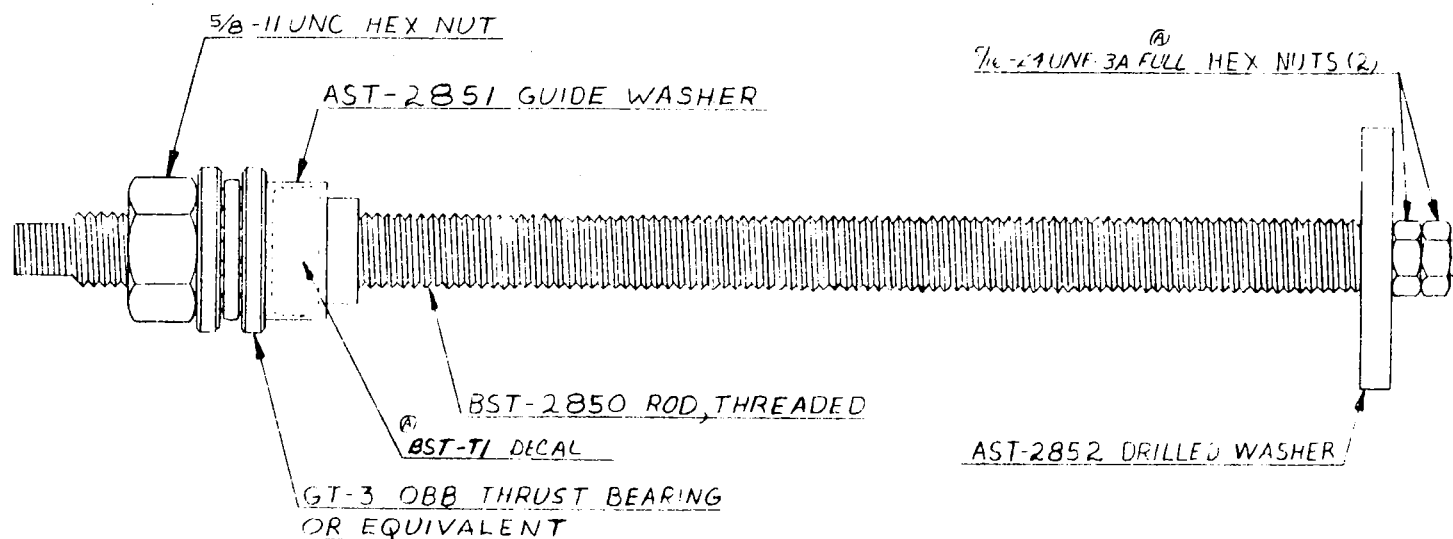
## TOLERANCES

FRACTIONS  $\pm 1/32$   
DECIMALS  
 $\pm .030$   
 $\pm .010$   
 $\pm .0005$   
 ANGLES  $\pm 1/2^\circ$   
 UNLESS OTHERWISE NOTED

AST-2855



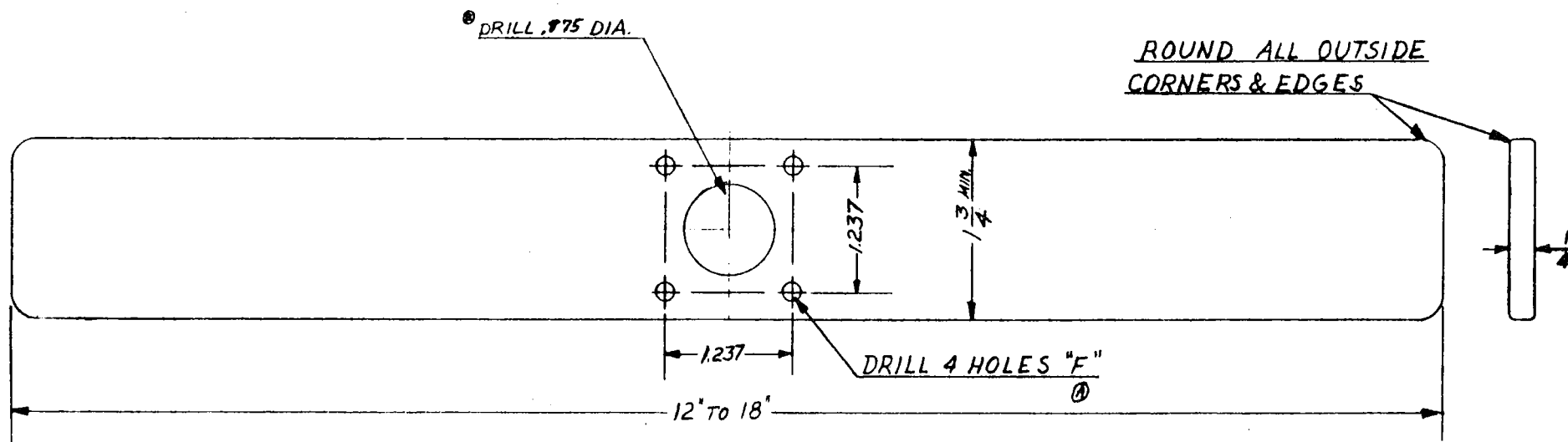
AST-2853 A



LET.	CHANGE	DATE	CHECKER
A	5/16-24 UNF-3A FULL HEX NUTS (2)	4/19/73	WBAH

DO NOT SCALE DWG. REPORT ANY CHANGES	MATERIAL	HEAT-TREAT	FINISH	WEIGHT	GRADE	CHECKED	APPROVED
HARTZELL PROPELLER INC. PIQUA, OHIO		ASSEMBLING TOOL				REPLACES	
		FOR H-1589 FEATHER ASSIST. DRIVING ASSEMBLY				REPLACED BY	
						SCALE	
						NO. REQ'D	
						BST 2853	

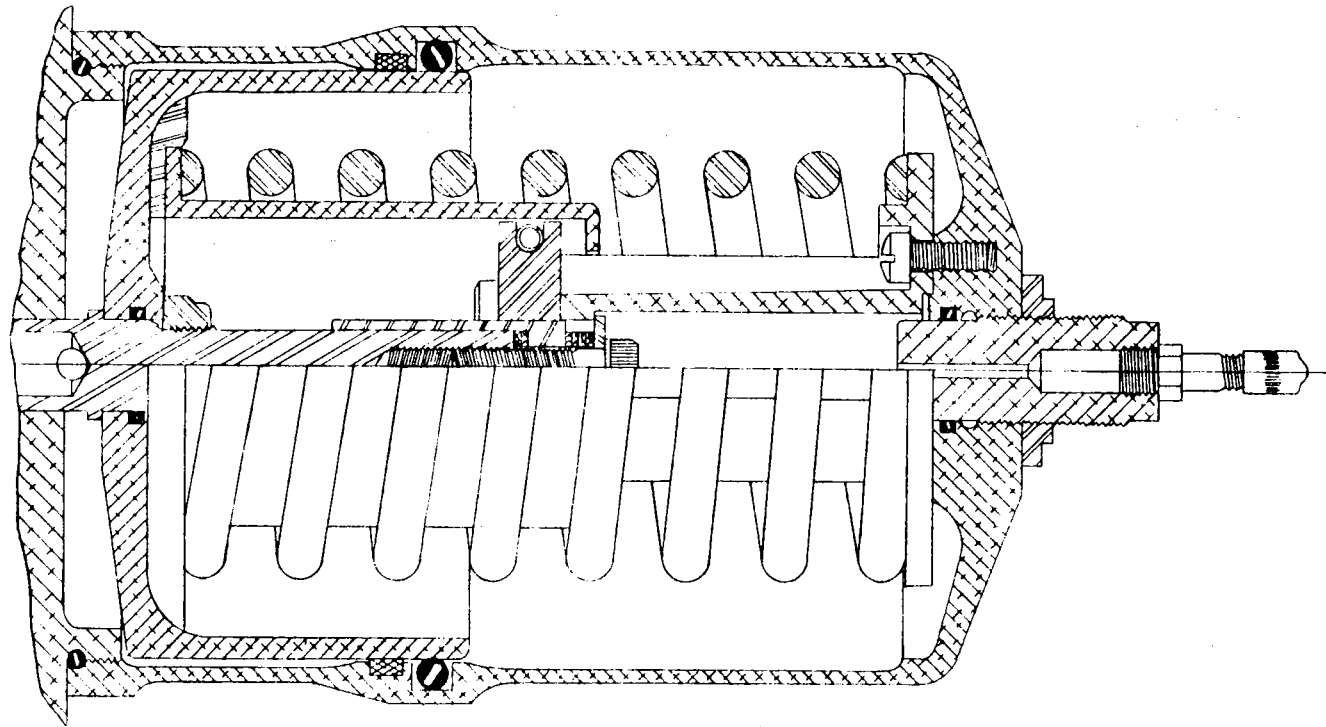
B 1087-18



LET	CHANGE	DATE	CHECKER
B	DRILL .875 DIA ADDED	6-4-61	LJB
A	"F" DRILL WAS #11 (CORRECTION)	2-18-64	LJB

DO NOT SCALE	COLD ROLLED CARBON	—	CADIUM PLATE	—	13W		L13	TOLERANCES	
DWG. REPORT								FRACTIONS	± 1/16
ANY CHANGES			H-S-5		12-5-61		12-13-61	DECIMALS	± .000
	MATERIAL	HEAT-TREAT	FINISH	WEIGHT	DRAWN	CHECKED	APPROVED	.000	± .010
								.0000	± .0005
HARTZELL PROPELLER CO.		WRENCH For MOUNTING						REPLACES	ANGLES
PIQUA, OHIO		CYLINDERS B-2224, B-2423, & B-2428						REPLACED BY	± 1/2°
DIV. OF HARTZELL INDUSTRIES INC.								SCALE FULL	UNLESS OTHERWISE NOTED
								NO. 28878	BT-2801

BSK-548



REV.	CHANGE	DATE	CHECKER

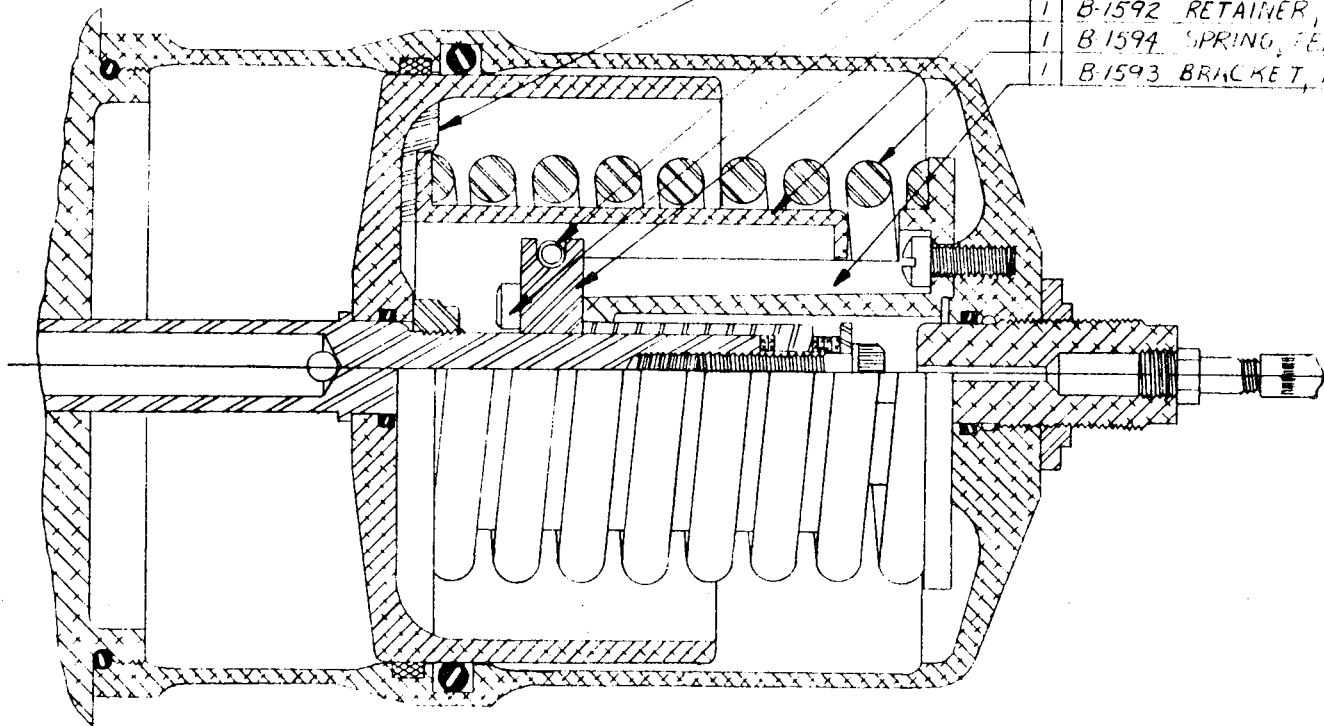
DO NOT SCALE DWG. REPORT ANY CHANGES		~	~	~		9/19/70	E.J.	W.B.H.	TOLERANCES FRACTIONS ± 1/32 DECIMALS .00 ± .004 .000 ± .010 .0000 ± .0005 ANGLES ± 1/4° UNLESS OTHERWISE NOTED	
		MATERIAL	HEAT-TREAT	FINISH	WEIGHT	DRAWN	CHECKED	APPROVED	REPLACES	
		HARTZELL PROPELLER INC. PIQUA OHIO				B-1589 FEATHER ASSIST SPRING ASSEMBLY SHOWN IN FEATHER POSITION			REPLACED BY	
									SCALE FULL	
									NO. REQ'D	
									BSK-548	

S. B. 470

BSK-547

B-1589 SPRING ASSEMBLY

- 1 A-1591 GUIDE, SPRING
- 1 A-1596 SPRING, HIGH PITCH STOP
- 4 A-1595 SHOULDER SCREWS
- 1 A-1590 WEIGHTS, HIGH PITCH STOP
- 1 B-1592 RETAINER, SPRING
- 1 B-1594 SPRING, FEATHERING
- 1 B-1593 BRACKET, HIGH PITCH STOP



DO NOT SCALE  
DWG. REPORT  
ANY CHANGES

MATERIAL

HEAT-TREAT

FINISH

WEIGHT

DRAWN

CHECKED

APPROVED

HARTZELL  
PROPELLER INC.  
PIQUA, OHIO

B-1589 FEATHER ASSIST SPRING  
ASSEMBLY SHOWN IN ENGINE START  
POSITION

REPLACES

REPLACED BY

SCALE FULL

NO. REQ'D

TOLERANCES  
FRACTIONS  
DECIMALS  
00 ±.000  
.000 ±.010  
.0000 ±.0005  
ANGLES ± 1/4°  
UNLESS OTHERWISE NOTED

BSK-547