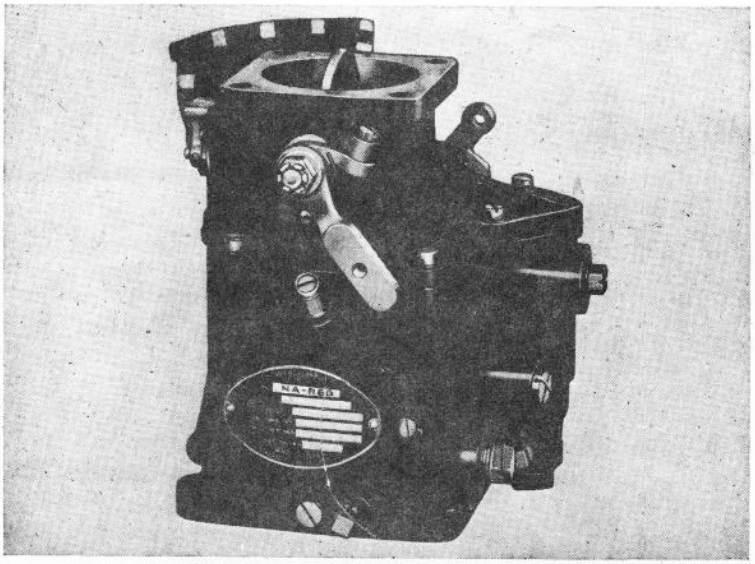
Instructions For Stromberg
NA-R6G AIRCRAFT CARBURETORS



GENERAL DESCRIPTION OF THE NA-R6G CARBURETOR

The Stromberg Model NA-R6G Carburetor is a single barrel, updraft unit. It has a single hinge type float mechanism, a metering needle type mixture control and Idle Cut-off, a throttle actuated economizer valve, a throttle actuated accelerating pump and an idle mixture adjustment quadrant.

The NA-R6G Carburetor was designed to give maximum maneuverability, with a float type carburetor for use on aircraft engines of approximately 220 HP.

The barrel size is #6, the actual diameter being 2-7/16 inches. This provides for the use of a maximum Venturi size of 2-1/16 inches.

The specifications and settings in this carburetor are the result of a great deal of test work conducted by the engine and carburetor manufacturers, both in the laboratory and in flight, and should not be changed unless it is absolutely certain that a change is necessary to meet unusual operating conditions.

FUNCTIONING OF CARBURETOR

This carburetor operates on the same basic principles used in other Stromberg models. Referring to Figure 2, it will be noted that fuel enters the carburetor through the fuel inlet (1), passes downward and through the Fuel Strainer Assembly (2), and enters the float chamber after passing through the float needle valve (3). The float needle valve (3) and float (4) maintain a constant level of fuel in the float chamber.

MAIN METERING SYSTEM: Air passing upward through the Venturi (21) at high velocity produces a reduction in pressure (a suction) on the main discharge nozzle (22). This causes fuel from the float chamber to be drawn through the mixture control needle seat (10), then through the main metering jet (9), and into the fuel channel (16). The Venturi vacuum (suction) also draws air through the main air bleed (25). Thus a small amount of air mixes with the fuel in the main discharge nozzle (22). This fuel and air is discharged into the air passing upward through the Venturi (21) and forms the combustible charge for the engine. The throttle valve (18) regulates the quantity of this mixture passing to the engine, thus regulating the power output. This main metering system is used for all engine operating conditions except idling.

ECONOMIZER SYSTEM: To provide a rich mixture at wide open throttle, which is necessary to obtain maximum power and to prevent overheating of the engine, an additional fuel passage is opened by a valve known as the economizer. As the throttle is opened beyond a certain point, the economizer arm (27), mounted on the pump stem and actuated by the throttle lever (17), opens the economizer valve (8). When the economizer valve (8) is open, the rate of fuel flow through the economizer system is regulated by the economizer metering jet (7). The fuel flowing through this jet joins the fuel from the main metering jet (9) to provide the rich mixture.

As the throttle valve is closed, the economizer valve spring (26) closes the economizer valve (8),

STROMBERG NA-R6G AIRCRAFT CARBURETOR

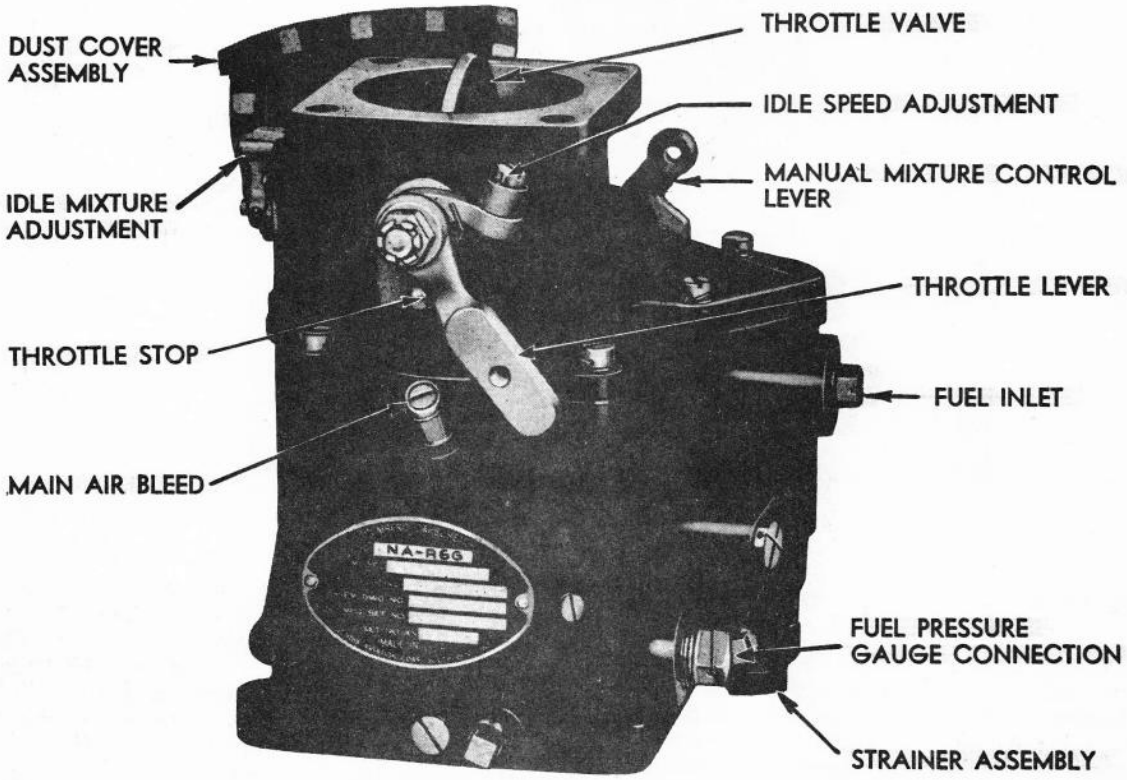


Figure 1

stopping the flow of fuel through the economizer metering jet (7). This makes available a leaner mixture, which in turn makes possible a considerable fuel saving for part throttle engine operation.

MIXTURE CONTROL: It is a well known fact that the mixture ratio delivered by the carburetor will become richer as an airplane climbs, due to decreased density of the air. To compensate for this enrichment when flying at various altitudes, a mixture control valve has been provided which is operated independently of the throttle.

As the mixture control lever (6) (shown in full rich position) is moved to the right, the mixture control needle (5) is moved downward into the mixture control valve seat (10) by the eccentric pin which is a part of the mixture control shaft. This reduces the flow of fuel, and makes possible an adjustment of the mixture ratio at any altitude.

ACCELERATING PUMP: To enable the engine to accelerate quickly and smoothly, a pump is utilized to provide additional fuel as the throttle valve (18) is opened. The pump sleeve (12) moves down as the throttle opens, and produces a pressure on the fuel within the sleeve. This pressure produces a downward force on the pump piston (13) which exceeds the force of the pump spring (15) and pushes the pump piston (13) down. This uncovers the holes in pump valve (14) allowing the fuel above the pump piston (13) to pass downward through the pump valve and to the main discharge nozzle (22). The pump spring (15) gradually forces the pump piston (13) up, producing a delayed fuel discharge until the piston seats on the valve which stops the flow from the pump. As the throttle valve (18) is closed, the sleeve is raised and the chamber within the sleeve is filled with fuel, which flows around the outside of the piston from the float chamber.

IDLE SYSTEM: When the engine is idling the throttle valve (18) is nearly closed, so the flow of air through the Venturi (21) is insufficient to produce enough vacuum (suction) to draw fuel from the main discharge nozzle (22). A separate idle system has, therefore, been incorporated to give the necessary fuel flow at low engine speeds. This system utilizes the high vacuum (suction) which exists above the throttle valve (18) to draw the fuel from a nozzle during the idling condition. This system is shown in Figure 3.

Fuel from the float chamber first passes through the main metering jet (9) to the main discharge nozzle (22), and flows through side holes in the main discharge nozzle. It then enters the idle metering tube (24) and mixes with a small amount of air from the idle air bleed (23). This fuel and air emulsion is drawn into the carburetor barrel through the idle discharge nozzle (19) by the high vacuum (suction) which exists above the throttle valve. After leaving the idle discharge nozzle, the fuel and air is mixed with more air which passes the nearly closed throttle valve giving a correct mixture for idling. As the throttle valve is opened, the vacuum (suction) at the idle discharge nozzle decreases and the vacuum (suction) at the main discharge nozzle increases so that the fuel ceases to flow through the idle system. It then flows through the main system.

INSTALLATION

The carburetor should be so mounted on the engine that the float chamber is at the side of the throttle barrel, preferably with the fuel inlet to the rear of the engine. With the carburetor in this position, the throttle lever, adjustable radially in 15° increments, will be on the left side and the mixture control lever on the right side, as viewed from the rear of the engine.

The fuel inlet is a 5/8″ pipe tap connection located in the upper rear part of the main body. If a fuel pump is used, a pressure of 3 lbs. per square inch at the carburetor is recommended and provision should be made for a fuel pressure gauge connection near the carburetor. If a gravity feed system is used, the tanks should be so located that the minimum head of fuel on the carburetor inlet is 24″ under all normal conditions of flight.

STARTING

The procedure for starting recommended by the engine manufacturer should be followed closely. If a primer is provided, it should be used when starting a cold engine. The exact procedure in starting varies with the type of starting equipment on the engine, but at low cranking speed, fuel can be drawn out of the idle system provided the throttle is closed or very nearly closed during the cranking operation. As soon as the engine starts to fire, it is usually necessary to open the throttle slightly to keep the engine running and to warm it up sufficiently for normal operation.

During cold weather when a very rich mixture is required for warming up, the engine may be kept running by partially opening the throttle frequently to give the engine an accelerating charge of fuel.

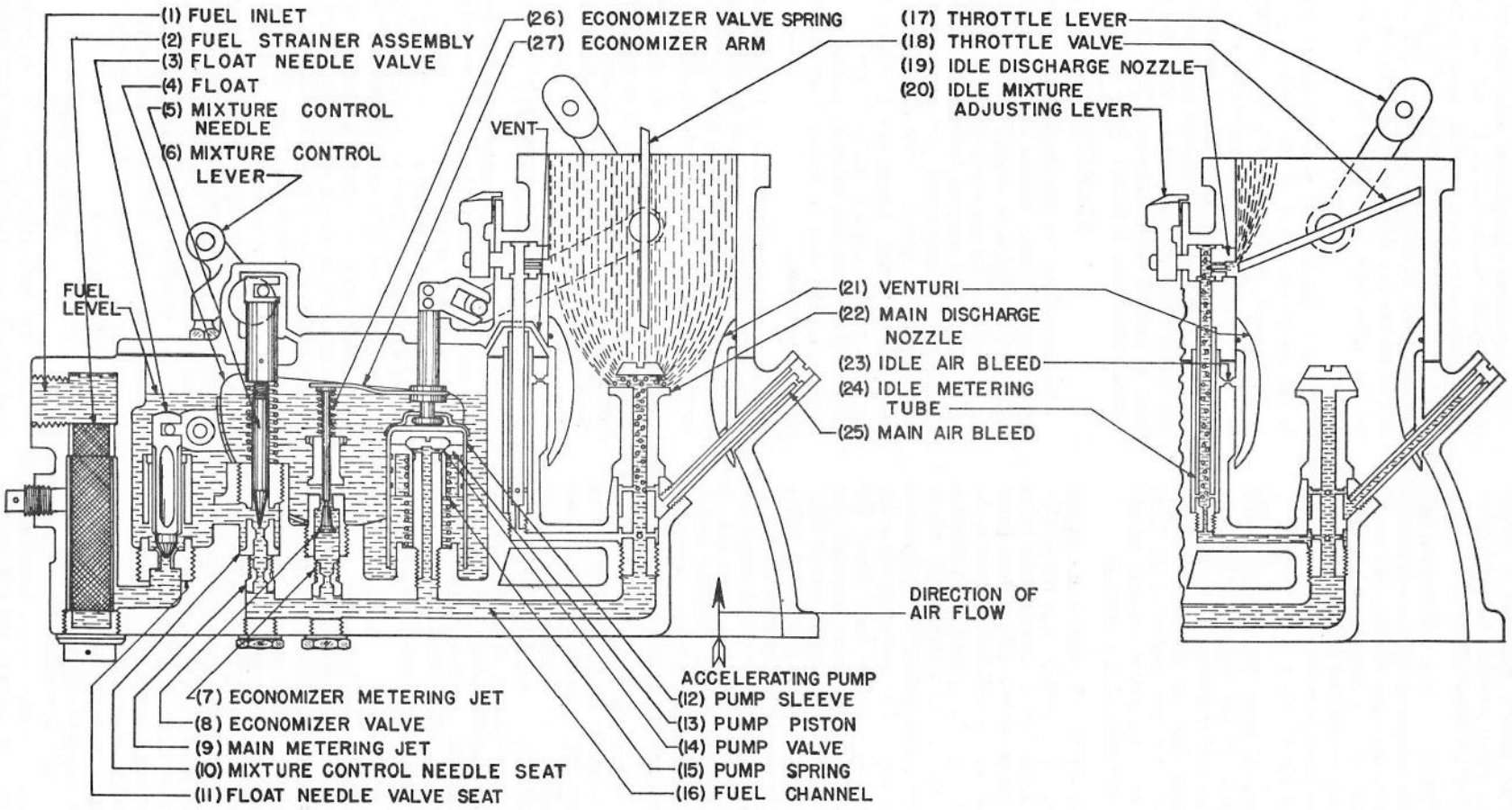
WARNING: *Do not operate the throttle before the engine starts to fire. The fuel thus pumped from the carburetor will settle in the air intake and there is a possibility of its catching fire if the engine backfires when it starts.*

ADJUSTMENT

The main and economizer metering jets used in this carburetor are of the fixed orifice type, so no adjustment for cruising and full throttle speeds is required. An idle adjustment is provided to take care of slight production variations in the carburetors and engines. A small lever at the front of the throttle valve body may be moved to control the richness of the mixture at idling speeds. A quadrant behind this lever indicates by the letters R and L the direction to move the lever to obtain a rich or lean mixture and also acts as a locking device to hold the lever in position. A throttle stop adjusting screw is provided on the throttle shaft, which should be adjusted to obtain the desired engine idling speed. Both the throttle stop and the idle adjustment should be set with the engine at normal operating temperatures to obtain the proper idling speed and smooth operation.

SERVICING

Once the carburetor has been properly installed and the idle adjustments made, very little attention is required in service. A fuel strainer (2), Figure 2,



FULL THROTTLE

FIGURE 2

IDLING

FIGURE 3

SCHEMATIC DIAGRAM OF NA-R6G CARBURETOR

is located in the chamber, under the fuel inlet of the carburetor. The fuel strainer assembly should be removed frequently for cleaning. This may be done by removing the square head strainer assembly plug, using T-24963 square socket. After removal, rinse the strainer assembly thoroughly in clean gasoline being sure that all dirt that may have settled into the sump of the strainer assembly plug has been stirred up and removed.

DUST COVER—A leather dust cover assembly covers the accelerating pump operating mechanism. This cover answers a two-fold purpose, 1—to keep dust and dirt away from the operating mechanism and 2—to maintain a small amount of lubricant on these parts. When this cover is replaced after removal for inspection, cleaning or overhaul, a very small amount of lubricating grease should be placed on the pump stem and fork assembly.

> CAUTION—Do not fill the dust cover with grease as the parts it is protecting require only a very small amount of lubricant.

The carburetor should be inspected frequently to see that all parts are tight and properly safetied.

OVERHAUL OF NA-R6G CARBURETOR

At each regular engine overhaul period, the carburetor should be disassembled for cleaning and inspection. This must be done in a clean place, with the necessary tools, which are listed at the end of these instructions. If these tools are not available, the carburetor should be taken to a dependable repair shop having the necessary overhaul equipment and trained personnel.

DISASSEMBLY: After the carburetor has been removed from the engine and cleaned on the outside, the halves of the carburetor may be separated by the removal of the six fillister head screws at the parting surface.

The mixture control needle and the pump sleeve are held in the upper half or throttle valve body, and will be drawn out of the lower half or main body as the throttle body is lifted off. The Venturi is held in the main body by a hexagon head screw.

The pump sleeve is a brass stamping and easily damaged. To prevent any danger of its dropping on the floor or bench, it should be slipped off the operating stem immediately.

To prevent damage to the carburetor, it is very important that the correct tools be used for removing each part. A list of parts and the special wrenches to be used for their removal follows:

Part Name	Tool Number
Float Needle Seat	T-19276
Guide, Mixture Control Needle	T-19272
Mixture Control Seat	T-20199
Economizer Assembly	T-19278
Metering Jets	T-24923

INSPECTION AND CLEANING: The bodies and all parts should be thoroughly cleaned in gasoline and all passages blown out with compressed air. Parts which should be inspected for wear are: float assembly, pump unit, mixture control unit, throttle shaft and bushings.

All variable parts should be checked to see that their sizes are in accordance with the carburetor specification sheet.

To check the float for leakage, submerge the float in hot water approximately 82.22° C. (180° F.) and watch for leaks. In case of leaks in the float, it should be dried out so no fuel or water remains inside; then, it should be soldered. Care should be taken in order that no large amount of solder is left on the float which would increase the weight and change the fuel level. After soldering, the float should be neutralized to eliminate any corrosive action which might be caused by soldering acid.

The float needle valve and seat should be checked for leakage by holding the needle valve with the point up and seat in place and filling the small space above the needle with gasoline. If any leakage is evident, the needle should be lapped into the seat with corcus powder or very fine grinding compound. If leakage cannot be stopped, a new needle and seat should be used, as it is very difficult to fit a new needle to an old seat or a new seat to an old needle

REPLACEMENTS: When ordering parts it is necessary to give complete information concerning the parts desired to avoid delay in shipment or the receipt of wrong parts. Wherever possible the serial number of the carburetor should be given. A careful reference to the attached assembly drawing #395215 should be made to determine the correct part number. If the part number is marked with an asterisk (*), the part is a variable part and the correct size should be given as specified on the specification sheet.

The number for the complete set of gaskets for this carburetor model is indicated on the assembly drawing.

REASSEMBLY: All headless screw plugs below the fuel level should be assembled with shellac. Care should be taken not to get shellac on the ends of the plugs where it may come off and be carried by the fuel into one of the metering orifices. Headless screw plugs above the fuel level and all other threaded parts screwed into the bodies should have a compound of graphite and caster oil put on the threads. Lockwire all parts provided with lockwire holes.

FUEL LEVEL: Float chamber fuel levels are set at the factory to conform with specification sheet on NA-R6G Carburetors with a fuel pressure of 3 pounds per square inch, and with a fuel of 0.710 specific gravity.

> NOTE: 1 pound per square inch of pressure is equal to a gravity head of 39 inches of 0.710 specific gravity fuel.

To check the float chamber fuel level, refer to specification sheet under "Float Mechanism". The check should be made using the same fuel pressure and fuel which are regularly used in service.

Fuel level adjustment is made by removing the float valve seat and changing gaskets. Thicker gaskets lower the level and thinner gaskets raise it. One sixty-fourth inch change in gasket thickness will change the level approximately 5/64". After assembling the needle seat, needle valve and float, the float should be moved up and down to see that it works freely on the fulcrum screw and the needle works freely in its seat.

ECONOMIZER SETTING: The economizer setting is the angular travel in degrees of the throttle valve from the fully closed position to the position at which the economizer starts to open.

Example: If the specification specifies an 18° throttle valve angle under "Idle System" and a setting of 45° under "Economizer", then the throttle valve position, measured from the horizontal top or attaching flange surface, should be 63° when the economizer starts to travel.

This setting is obtained by clamping the pump lever on the throttle shaft with the throttle in the completely closed position (idle speed adjusting screw backed off) and the center of the pump lever pin 15/32″ below the top flange of the carburetor as shown in Figure 4. The pump lever and throttle shaft should then be pinned together as indicated in Figure 4. The economizer setting should then be checked by measuring the angle of the throttle valve when the economizer arm contacts the economizer valve. The point at which the economizer valve starts to open can be felt when the throttle is opened slowly. Small adjustments may be made by carefully bending the economizer arm (27), Figure 2.

MIXTURE CONTROL: When any parts of the mixture control system are replaced, care should be taken to see that they are assembled correctly.

The mixture control needle is operated by an eccentric pin which is a part of the mixture control stem assembly. It is important that the stop on the stem be located at the correct angle with respect to the eccentric pin. This may be accomplished by pinning the stop on the stem so that the eccentric pin is toward the pump mechanism and the bottom of this eccentric pin is 25/32″ from the parting surface, and the stop is against the stop screw in the full rich position as shown in Figure 5.

The mixture control needle should be screwed into the needle holder and adjusted to conform with the travel given on the specification sheet under "Mixture Control Needle". This travel is to be obtained when the mixture control lever moves from the fully closed position to the fully open position. The lever should travel 75 to 80 degrees as indicated in Figure 5.

An approximate adjustment may be obtained before assembling the needle valve in the throttle body by setting the bottom of the needle holder slot 17/32″ from the main body parting surface with the needle valve held down against the needle valve seat (See Figure 6). When this preliminary adjustment has been made, assemble the two halves of the carburetor together and determine if the needle has the specified travel.

The needle travel may be checked by removing the plug and jet below the needle and using the simple apparatus shown in Figure 7. When in the full lean position, the needle stops against the needle valve seat; when in the full rich position, the stop strikes the stop lug. When the proper adjustment has been made, pin solder the needle as shown in Figure 6 to prevent its changing in Service. In assembling the needle in the carburetor throttle body, the slot in the needle holder should be placed with the opening facing the pump mechanism.

NA-R6G OVERHAUL TOOLS

Name	Size	Tool No.
Handle, Sliding Offset	3/8″ x 8″	T-19279
Handle, Metering Jet Screw Driver		T-24950
Reamer, Throttle Bushing	.4395 Dia. x 15 5/8″	T-16910
Remover, Throttle Bushing		T-19492
Screw Driver	.037 x 3/8″	T-18170
Screw Driver	.047 x 1/4″	T-18172
Screw Driver, Type A & B Metering Jet		T-24923
Socket Screw Driver	.062″ x .687″	T-19272
Socket Screw Driver, Mixt. Cont. Seat	.048″ x .547″	T-20199
Socket Screw Driver, Econ. Assy.	.062″ x .547″	T-19278
Socket, Double Hex	9/16″	T-24944
Socket, Square	11/16″ Sq.	T-24963
"T" Wrench Extension	5″ with 3/8″ Driver	T-20183
Handle Bar (for use with T-20183)	7″	T-20184
Socket, Screw Driver End	.068″ x 3/4″ with .484″ Pilot for Float Seat	T-19276
Wrench, End	3/4″ x 13/16″ - 1/8″	T-20222
Taper Pin Reamer (with handle)	For #0000 Taper Pin	T-24957

STROMBERG AIRCRAFT CARBURETOR SERVICE
Bendix Products Division
South Bend, Indiana
U. S. A.

ADJUSTMENT OF PUMP LEVER ON THROTTLE SHAFT

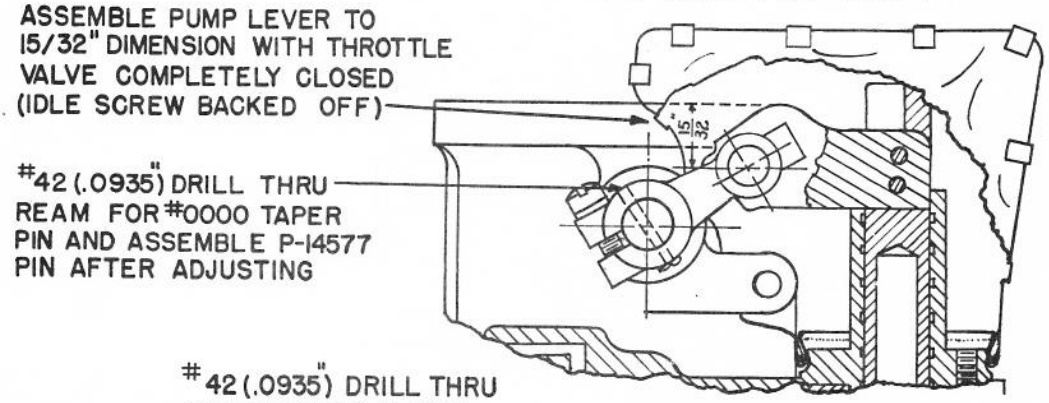


FIG. 4

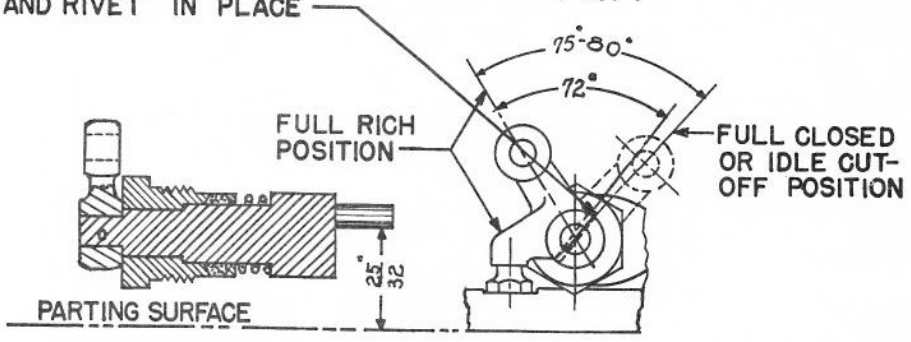
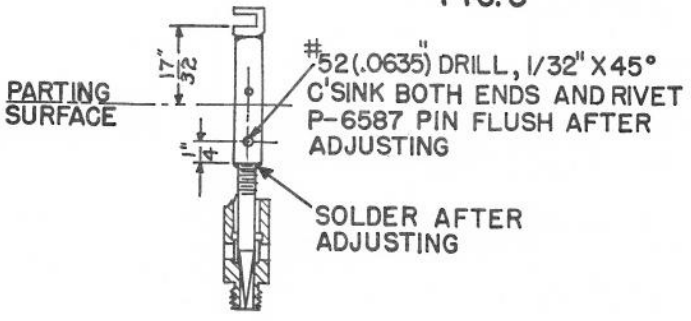
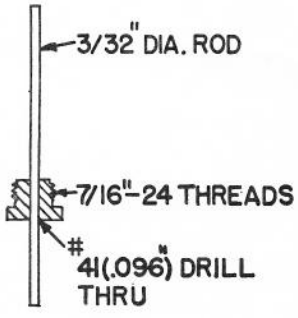


FIG. 5



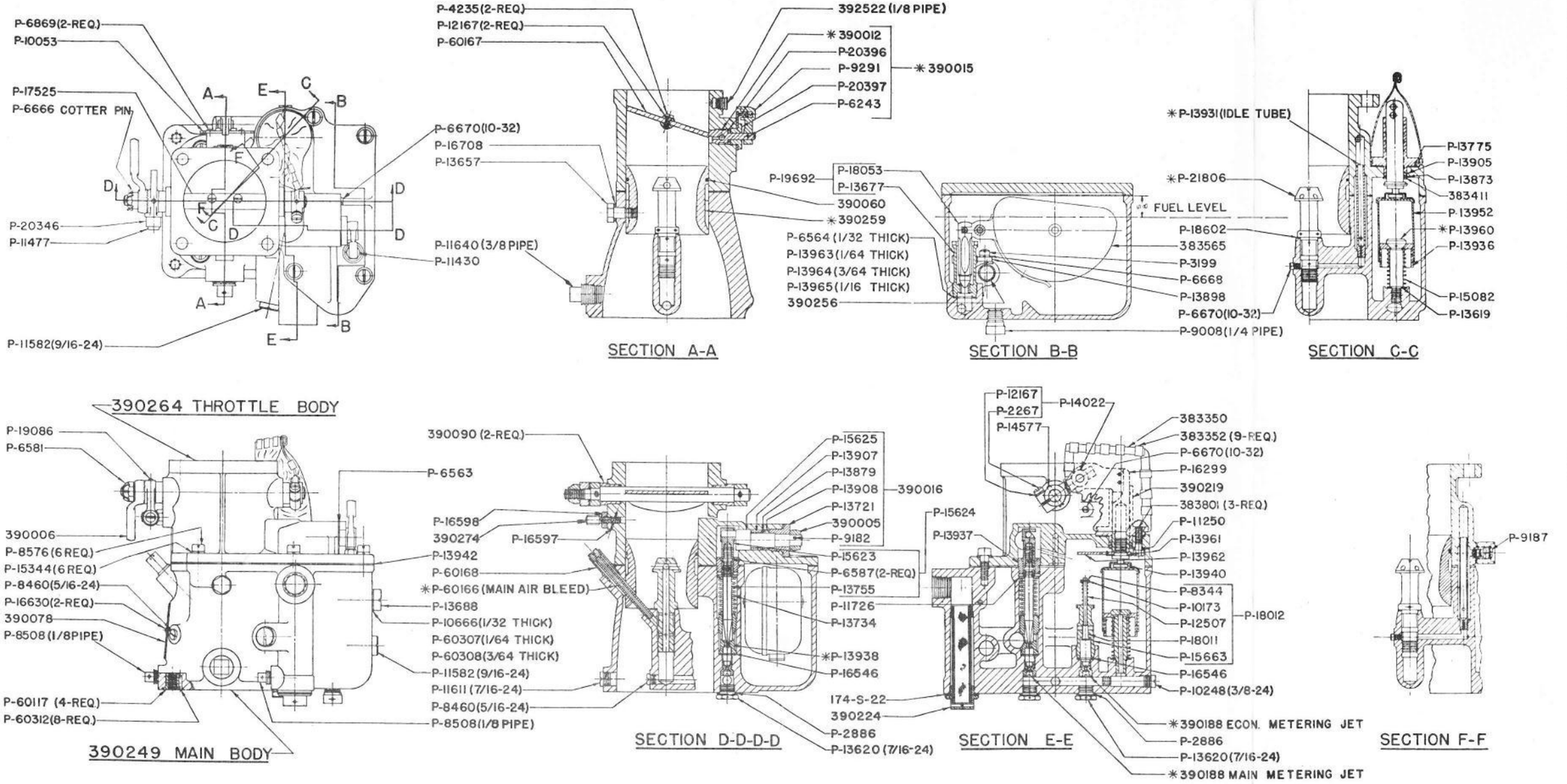
PERLIMINARY ADJUSTMENT OF MIXTURE CONTROL NEEDLE

FIG. 6



TOOL FOR CHECKING MIXTURE CONTROL NEEDLE TRAVEL

FIG. 7



NOTE-COMPLETE SET OF GASKETS FOR CARBURETOR, 390283

WHEN ORDERING PARTS MARKED * ALWAYS GIVE SIZE OR ENGINE MODEL. FOR SPECIAL PARTS AND SIZES OF VARIABLE PARTS REFER TO CARBURETOR SPECIFICATION SHEETS

DO NOT SPECIFY THIS DRAWING NUMBER ON ORDERS. GIVE NAME AND ENGINE MODEL FOR WHICH CARBURETOR IS ORDERED. GIVE SERIAL NUMBER OF CARBURETOR IF POSSIBLE WHEN ORDERING PARTS.

STROMBERG CARBURETOR

MODEL NA-R6G

SCALE-FULL SIZE

DRAWN	TRACED	ISSUE
J.L.B.		1

CHECKED | APPROVED | DATE 7-19-42

395215

BENDIX PRODUCTS DIVISION, SOUTH BEND, INDIANA, U.S.A.