

FIREFLY BALLOONS, INC.

801 SALISBURY ROAD

STATESVILLE, NC 28677

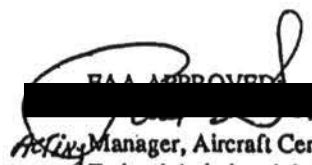
FAA - APPROVED  
BALLOON FLIGHT MANUAL  
for  
THE FIREFLY 10 BALLOON

NOMINAL VOLUME: 180,000 CUBIC FEET

Registration No.

Serial No.

THIS FLIGHT MANUAL MUST BE CARRIED IN THE BALLOON  
DURING EACH FLIGHT

  
FAA APPROVED  
Acting Manager, Aircraft Certification Office,  
Federal Aviation Administration,  
Atlanta, Georgia

DATE: JULY 14, 1992

REVISED MAR 1 - 2001

FIREFLY BALLOONS, INC.  
BALLOON FLIGHT MANUAL  
FIREFLY SERIES

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### 3.5.5 LEVEL FLIGHT

Level flight is more fuel-efficient than climbs and descents. In all flight, controlling the balloon with burner alone is more fuel-efficient than alternating between burner and envelope valve.

### 3.5.6 DESCENDING

Start descent either by opening the envelope valve or by allowing the envelope to cool. Control the rate of descent with burner and envelope valve.

During descent, the envelope may distort and the balloon may slowly rotate. If the lower part of the envelope tends to close, use short burns to stabilize the descent.

Rates of descent up to 500 ft. (152m.) per minute are recommended as normal procedure. For faster rates of descent, consult SECTION 5, PERFORMANCE. Always start recovery from any descent early enough to recover to level flight and full control well above the level of dangerous obstacles.

#### CAUTION

LONG BURNS MAY BE NECESSARY TO RECOVER FROM RAPID DESCENT. ALLOW FOR CONTINUED AFTER-BURN INCREASE IN ENVELOPE TEMPERATURE TO AVOID EXCEEDING THE LIMIT. EXERCISE SPECIAL CARE WHEN USING DOUBLE BURNERS. BEWARE OF BURNER FLAME INSTABILITY (SEC. 4.5)

### 3.5.7 PRIOR TO LANDING

- (1) Stow and secure all loose gear.
- (2) Check for fuel quantity and pressure adequate to clear obstacles and land. Plan ahead to avoid switching tanks during the landing.

- (3) Assure that tank restraints are snug and that all valves not to be used for landing are firmly closed.
- (4) Remind passengers of landing procedures.

### 3.6 LANDING

Allow for wind speeds in planning the landing approach. During approach, limit descent rates to avoid:

- (1) Excessive burning to clear obstacles.
- (2) Extensive final burning resulting in touchdown with a hot envelope.

The best approach ends in touchdown (as gentle as possible) with the envelope below equilibrium temperature and cooling rapidly as the pilot continues to hold the envelope valve open. Advantages of a cool envelope become especially important in windy conditions:

- (1) Less effort to open/hold open the envelope valve.
- (2) Quicker response to the valve for rapid descent if necessary.
- (3) Less probability of rebound after touchdown and less forcible rebound if one does occur.
- (4) Quicker envelope laydown and deflation to avoid dragging after touchdown.

Limitations on using the envelope valve do not apply for landing. The valve may be used at the pilot's discretion - and discretion is required because:

- (1) Descent rates that seem gentle at higher altitudes may be faster than desired for landing.
- (2) Descent from wind into calmer air may slow the envelope and increase relative wind across the top, producing false lift and at the same time cooling the envelope. As descent continues, false lift will cease, allowing the cooled envelope to descend at an increased rate.

3.6 LANDING (cont'd)

- (3) Lower envelope temperatures make the valve easier to open and also increase response to the valve.
- (4) Lower altitudes increase response to the valve and leave insufficient time to correct from over-valving.

**CAUTION**

OVER-VALVING AT LOW ALTITUDE CAN RESULT IN UNCONTROLLED DESCENT TO A HARD LANDING. EXERCISE EXTREME CARE WHEN LANDING AT DESCENT RATES APPROACHING 500 FEET PER MINUTE AND/OR IN WINDS ABOVE 7 MILES PER HOUR.

FOR HARD LANDINGS, SEE SECTION 4.4

Select a landing site as free as possible from obstacles that might damage the balloon - but with this exception:

DO NOT HESITATE TO RISK DAMAGE AND/OR HARD LANDINGS TO AVOID ANY POSSIBILITY OF CONTACT WITH POWERLINES OR OTHER DANGEROUS OBSTACLES. FOR DANGEROUS OBSTACLES, SEE SECTION 4.1.

Select a landing site where the pilot alone can control the landing. A ground handling line should be deployed only in very calm conditions. In avoiding dangerous obstacles, do not depend upon ground personnel for restraint of handling line or carriage.

**CAUTION**

FIREFLY BALLOONS DROPLINE IS NOT A TETHER LINE. DO NOT USE IT TO FORCIBLY RESTRAIN A BALLOON.

3.6 LANDING (cont'd)

Just prior to touchdown:

- (1) Make sure that the Trigger Valve (and/or Fire 2 Valve if in use) is firmly closed.
- (2) Close the Pilot Light Safety ShutOff.

Action (2) is a precaution against possibility that pilot lights or accidental burning might damage the envelope or ignite anything at the landing site. Note that (2) commits the pilot to the landing and must be delayed until possibility of a missed approach is past.

For landings to be followed by another take-off, provided touchdown is gentle and winds are light:

- (1) Action (2) above may be omitted, leaving the burner operable. If however, it is seen that touchdown will be harder or winds stronger than expected, close the ShutOff and then relight pilot lights after the landing is complete.
- (2) Keep the envelope inflated and erect, but at well below equilibrium temperature.
- (3) Ensure that the balloon is properly restrained before exchanging passengers. Exiting passengers give the effect of added lift. Windflow over the envelope may provide temporary false lift.
- (4) Brief new passengers and repeat appropriate pre-flight checks before take-off.

After touchdown:

- (1) In calm conditions or in very light wind, use the crown line to pull the envelope aside so it does not deflate around the carriage. Laying the carriage over toward the deflating envelope makes it easier to prevent suspension cables, skirt or envelope from contacting hot burner coils.
- (2) In windy conditions, deflate the envelope quickly so it cannot drag the carriage.

3.6 LANDING (cont'd)

- (3) If rebound is forcible, release the envelope line when rebound pulls it upward and then re-open the valve as soon as possible.

After landing, bleed all fuel lines:

- (1) Make sure that all valves on all tanks are firmly closed.
- (2) Check for safety before bleeding fuel lines. If necessary, postpone (3) to a safe location.
- (3) Open the Trigger Valve and the Pilot Light Safety ShutOff. Do not leave the pilot light system pressurized for long periods of time, i.e., do not leave the system with Pilot Light Valve open and Pilot Light Safety ShutOff closed for extended periods.

3.7 PACKUP AND STORAGE

3.7.1 ENVELOPE

- (1) After deflation is completed, disengage and stow suspension cable toggles in their marked storage loops.
- (2) Remove Mechanical Temperature Gauge if installed.
- (3) Dry wet envelopes before storage.
- (4) Pack the envelope and store out of sunlight as soon as possible.

3.7.2 FUEL SYSTEM

After assuring that no fuel is trapped in any line, close the Trigger Valve. Leave the Pilot Light Safety ShutOff in open position.

Before transport:

- (1) Dismount the burner from the burner support.
- (2) Adjust fuel hoses so they do not contact tanks, vibrate against damaging objects, or protrude enough to be hit and damaged during travel. Cord or leather lacing may be used to secure hoses.

CAUTION

TRANSPORT TANKS IN POSITION IN THE CARRIAGE TO AVOID VALVE DAMAGE THAT MIGHT OCCUR BECAUSE OF THE TOP COLLAR CUTOUT.

For long periods of storage and/or for storage at low temperatures, it is recommended that tanks be filled to the legal (80%) limit to avoid contamination from internal moisture condensation.

CAUTION

RISING TEMPERATURE MAY CAUSE THE TANK SAFETY VALVE TO RELEASE PROPANE. STORE TANKS OR CARRIAGE WITH TANKS INSTALLED IN A WELL-VENTILATED PLACE. DO NOT STORE UNDERGROUND OR INSIDE AN ENCLOSURE OR NEAR ANY POSSIBLE IGNITION SOURCE.

#### 4.3 FUEL LEAKS (cont'd)

Fire fed by Main Fuel System leak:

- (1) Lock Trigger Valve open (decreases pressure feeding fire).
- (2) Close tank valve on tank in use (other tank valves should already be closed).
- (3) Close Pilot Light Safety ShutOff.
- (4) After fire is out, relight pilot lights and land on Fire 2. See Fire 2 CAUTION above.

Trigger Valve O-Ring leak:

- (1) Lock Trigger Valve open and leave it open.
- (2) If leak stops, land using the tank valve to control the burner.
- (3) If leak does not stop, close the tank valve and land on Fire 2. see Fire 2 CAUTION above.

Tank Valve Stem leak:

- (1) Open tank valve fully.
- (2) If leak does not stop, close tank valve securely and land using fuel from other tanks.

Pilot Light System leak:

- (1) Close Pilot Light Safety Shutoff.
- (2) Close Pilot Light Valve on Tank No.1.
- (3) If leak stops, follow procedure in SECTION 4.2.2, BURNER RELIGHT, Pilot Lights Inoperative.
- (4) If leak does not stop, snap the Pilot Valve open and shut several times.
- (5) If leak cannot be stopped by any means, re-open the Pilot Light Safety ShutOff (diverts leak away from pilot/passengers) but do not relight pilot lights or operate any other ignition source. Prepare for a hard, burner-off landing.

#### 4.4 HARD LANDINGS

Consider any landing at a descent rate exceeding 500 ft. per minute an emergency. The faster the descent, the more likely are injury to occupants and damage to the balloon. FOR HARD LANDINGS, EXPECT THE FOLLOWING:

The envelope will continue to descend after carriage impact.

- (1) Skirt and suspension cables will descend upon or around the carriage.
- (2) Slack cables may enter the carriage.

The envelope will then reverse directions, elongating as it rebounds, temporarily uncontrollable.

- (1) Suspension cables will snap taut as rebound lifts the carriage off the ground.
- (2) The envelope valve line will be pulled upward forcefully.
- (3) If ground wind is present, the balloon will move downwind during rebound.

The balloon will then return to the ground more gently. The cooler the envelope, the less the force and height of the rebound. An envelope above equilibrium temperature (or one suddenly relieved of occupant weight) will attempt to turn a rebound into another take-off.

FOR HARD LANDINGS, USE THE FOLLOWING PROCEDURES:

- (1) Brief passengers. Assure that all fuel tank restraints are snug and that gear is secure.
- (2) Close all valves on all fuel systems securely before impact. Make sure that no ignition source is operating or operable.
- (3) Take a firm handgrip on the envelope valve line before impact.
- (4) On impact, pull the envelope valve fully open.
- (5) Keep clear of or below any slack suspension cables that enter the carriage. Rebound will snap these cables upward forcefully.
- (6) Release the envelope valve line when the force of rebound and elongation pulls it upward. Do not attempt to overcome this force.

4.4 HARD LANDINGS (cont'd)

- (7) At maximum envelope elongation, again pull the envelope valve fully open.

4.5 BURNER FLAME INSTABILITY ("SWOOSH")

Certain conditions, generally associated with low ambient air densities, may cause flame instability after several seconds of continuous burner operation.

Under these conditions, flameout can occur:

- (1) There is a change in the sound of the burner flame - a "swoosh" noise.  
If burning is continued—
- (2) The burner flame may decrease in size and velocity.  
If burning is still continued
- (3) Burner flame and pilot lights may be extinguished.

Flameout can usually be avoided by ending the burn at the initial "swoosh" sound and leaving the burner off for one or two seconds. Further "swoosh" can be avoided by using short burns.

**CAUTION**  
TEST LONG BURNS FOR FLAME INSTABILITY BEFORE RELYING ON THEM FOR ARRESTING RAPID DESCENT OR CLEARING OBSTACLES.

4.6 ENVELOPE DAMAGE

If damage occurs during inflation or take-off, terminate the flight.

If damage occurs during flight (such as in severe turbulence) burn only enough to keep the envelope fully inflated until the balloon climbs or descends into more stable air. Land as soon as possible.

4.6 ENVELOPE DAMAGE (cont'd)

If an envelope has sustained major structural damage, do not open the envelope valve. Keep the envelope fully inflated and allow it to cool and descend gradually.

4.7 ENVELOPE OVER-TEMPERATURE

If the envelope temperature limit is likely to be exceeded:

- (1) Reduce burner use and continue flight with reduced temperature. Try a lower altitude.
- (2) If envelope temperature is not reduced to an acceptable level, land and investigate cause.

If the envelope temperature limit is exceeded:

- (1) Inspection of envelope fabric by FAA-certified repairperson is required before further flight.
- (2) A logbook entry of the inspection is required.

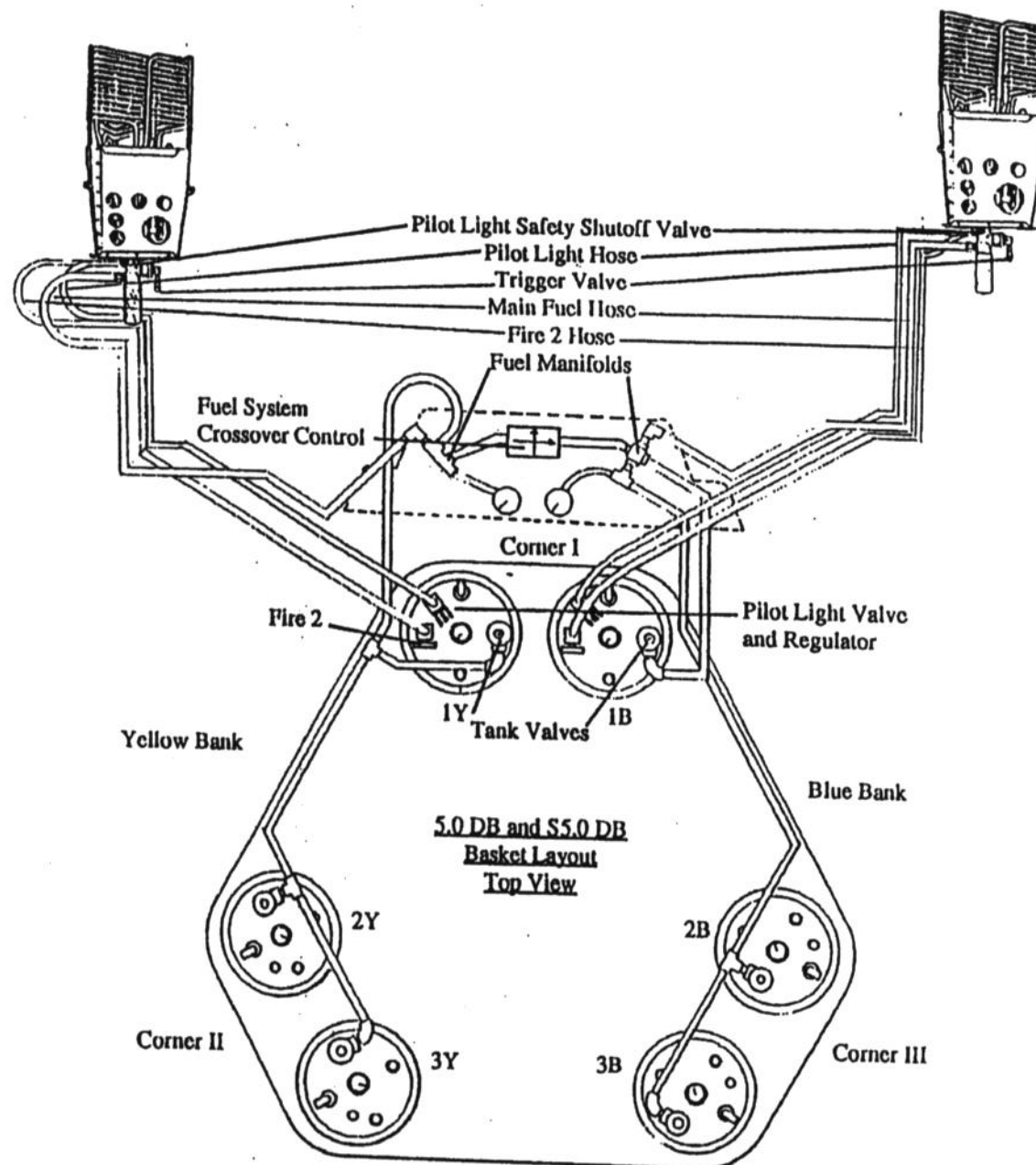
4.8 MAIN FUEL SYSTEM FAILURE

Use Fire 2. Take extra care in directing Fire 2 flame in windy or turbulent conditions. Land as soon as possible.

**CAUTION**  
ALLOW FOR MUCH SLOWER BALLOON RESPONSE WHEN USING FIRE 2 INSTEAD OF THE MAIN BURNER SYSTEM. LOW FUEL PRESSURE AND/OR HEAVY LOADS FURTHER SLOW RESPONSE. EXERCISE SPECIAL CARE IN KEEPING DESCENT RATES UNDER CONTROL WHEN USING FIRE 2 ALONE.

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Fuel System Diagram - 6 Tanks

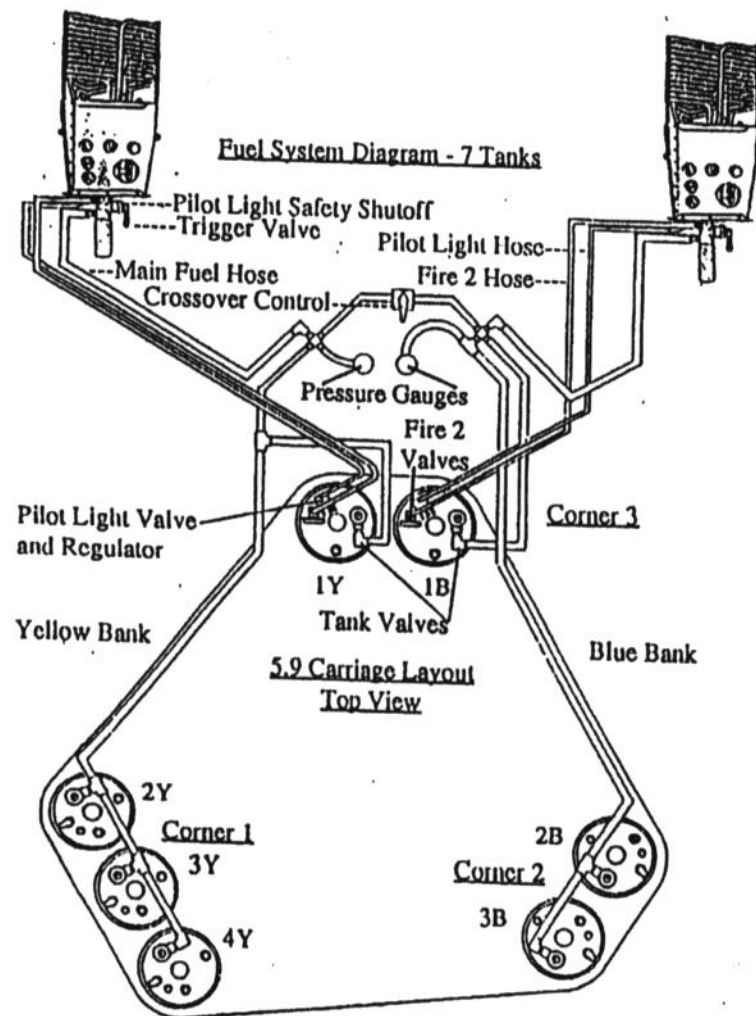


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APP C1

FIREFLY BALLOONS, INC.  
BALLOON FLIGHT MANUAL SUPPLEMENT  
FIREFLY 10 BALLOON

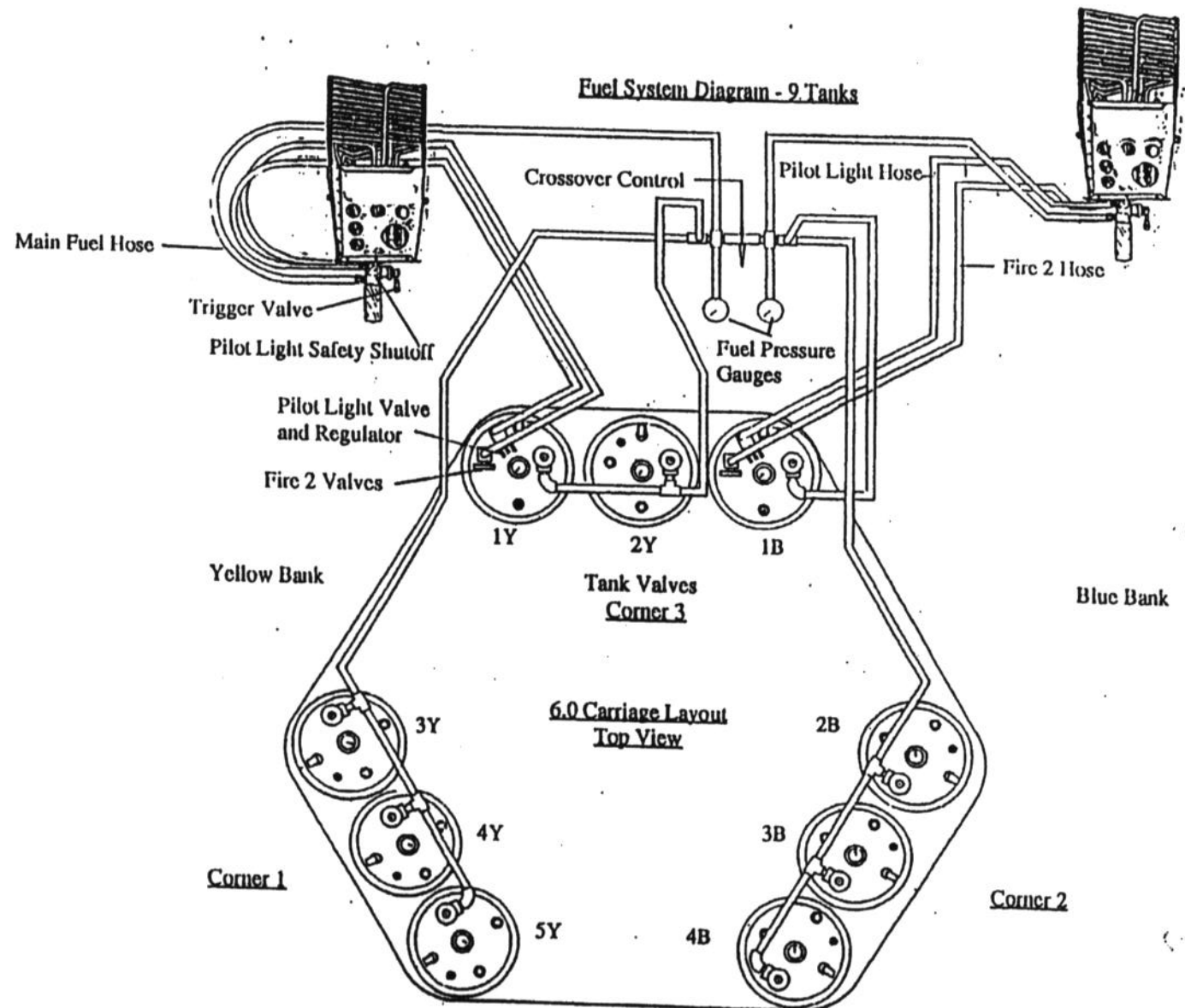


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APP C2

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APP C3