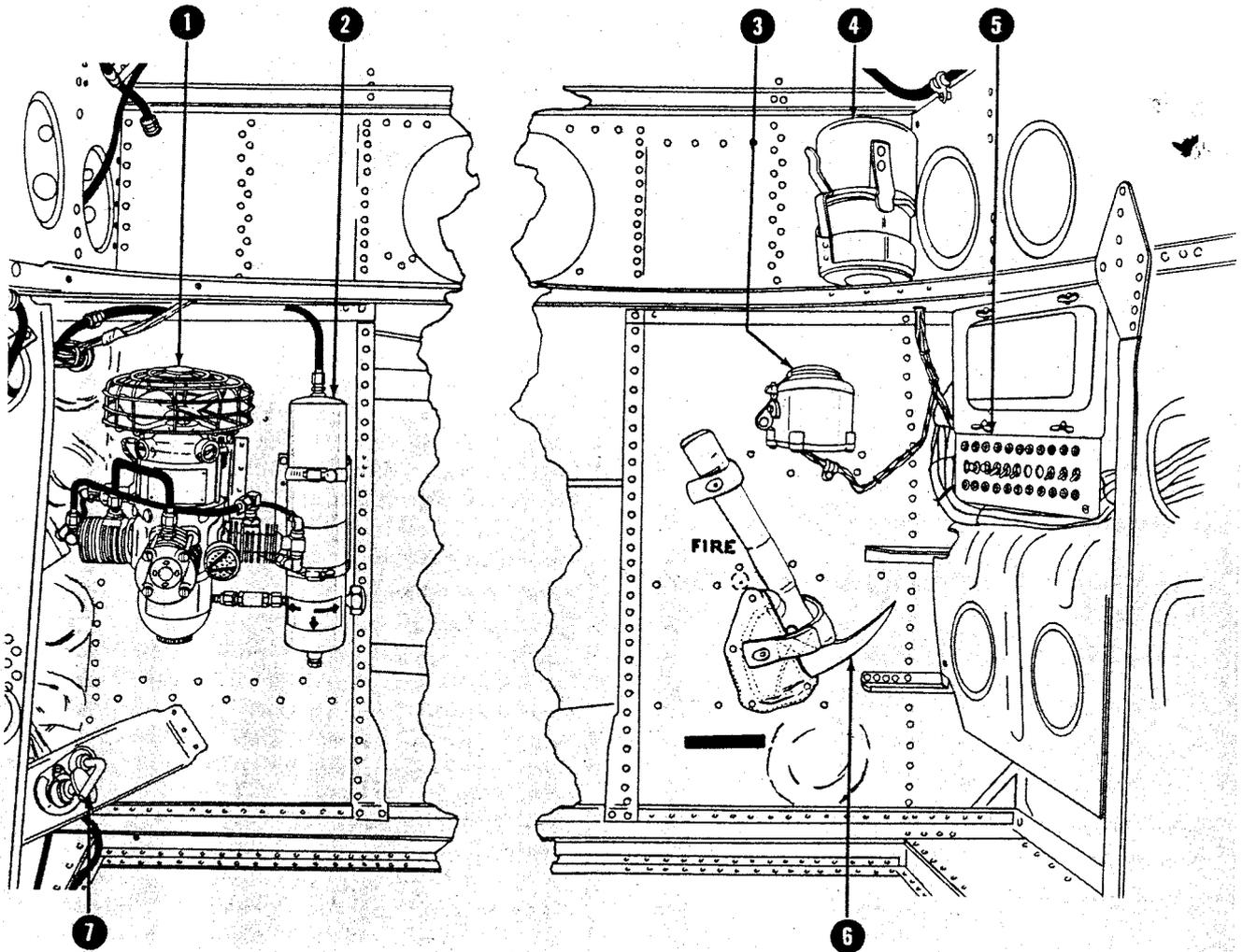


# GUNNER'S COMPARTMENT-AFT VIEW



- |                                     |   |
|-------------------------------------|---|
| 1 GUN CHARGER SYSTEM AIR COMPRESSOR | 5 AFT CIRCUIT BREAKER PANEL             |
| 2 GUN CHARGER SYSTEM AIR BOTTLE     | 6 FIRE AXE                              |
| 3 IFF RADAR INERTIA SWITCH          | 7 PERISCOPE ANTI-ICING HAND PUMP HANDLE |
| 4 RELIEF CONTAINER                  |   |

2. 1.2-2-44

Figure 4-23

provided with each box containing 800 rounds and supplying two guns. The ammunition is fed to the guns through a chute at the chamber and the empty shell cases are ejected through a chute underneath. The eight gun nose has eight ammunition boxes containing 360 rounds of ammunition each and each box supplies one gun. The 75 mm cannon is loaded by a gun-loader (navigator) in the pilot's compartment. Twenty rounds of ammunition are carried in a rack above the cannon in the right forward corner of the pilot's compartment. The gun-loader's seat is mounted on an ejection chute through which ejected shell cases travel from the cannon into a canvas bag installed

in the bomb bay. The 37 mm cannon has three boxes of ammunition with 25 rounds in each box. The trunnion block assembly on which the ammunition box is mounted is opened at the bottom to permit ejection of the empty cartridge cases. The internal wing guns are fed from six ammunition boxes in the wing which have a total capacity of 1300 rounds. When the guns are mounted externally the ammunition is fed through four or eight 300 round ammunition boxes in the wings. All empty cases from .50 caliber machine guns are ejected into the airstream through chute openings under the guns.

**Gun Charger System.**

**A** The guns are charged pneumatically by compressed air stored in tanks in the nose and wings. The tanks are charged by a compressor in the gunner's compartment. Relief valves at each tank are set at 1400 psi. The compressor is wired to the 28-volt D-C bus bar through a circuit breaker located on the pilot's circuit breaker panel. When the battery switches are on and the circuit breaker is closed the compressor is operative. The actual charging of the guns is accomplished by placing the gun selector switches in the ON position and momentarily placing the gun charger switch to ON.

**CAUTION**

To prevent damage to the actuating mechanism, do not hold the gun charger switch in the ON position for more than 30 seconds.

**Operation of .50 Caliber Machine Guns.**

- A**
1. Gun heater switch—ON as necessary to heat guns, then OFF.
  2. Gun-bomb sight reticle rheostat—ON.
  3. Guns and camera switch—GUNS and CAMERA.
  4. Wing guns selector switch—ON.
  5. Nose guns selector switch—ON.
  6. Gun hold back switch—HOLD, as required.
  7. Gun charger switch—ON, momentarily.
  8. Gun trigger—DEPRESS.

**Cannon Operation.**

- A**
1. Gun-bomb sight—0 degree setting.
  2. Gun-bomb sight reticle rheostat—ON.
  3. Receive "OK to fire cannon" signal from the gun-loader.
  4. Guns and camera switch—GUNS and CAMERA.
  5. Cannon selector switch (for 37 mm or 75 mm cannon)—ON.
  6. Airspeed—Maintain the airspeed that was predetermined at the time the cannon was boresighted.
  7. Cannon trigger—Depress.

**TURRET GUNS.**

**A** and **B** The turret guns consist of an upper and lower turret equipped with .50 caliber machine guns, a turret sighting unit, a turret control panel, and the necessary electrical equipment and controls for operating the equipment.

**Turrets.**

**A** and **B** An upper and lower turret, each equipped with two .50 caliber machine guns, are installed on the aircraft. Each turret is equipped with a fire interrupter assembly which automatically interrupts gun fire in areas of wing and empennage surfaces and propeller arc. Elevation travel of each turret is controlled by integral limit stop switches. A contour follower assembly in each turret prevents the guns from touching or damaging any part of the aircraft structure as they are moved in azimuth or elevation. A compressor is installed in each turret which charges the guns when the gun selector switches are ON and the gun charger switch is ON. Two ammunition boxes, each containing 500 rounds, are located in each turret. The turrets are powered by a dynamotor (115-volt, 400-cycle A-C) which operates from the 28-volt D-C bus bar system. The turrets move synchronously with the turret sighting unit when the action switch is engaged. The turrets are controlled and guns fired by the gunner; however, provisions are made for the pilot to fire the upper turret guns on aircraft with "flat-top" canopies. Refer to GUN TRANSFER, this section.

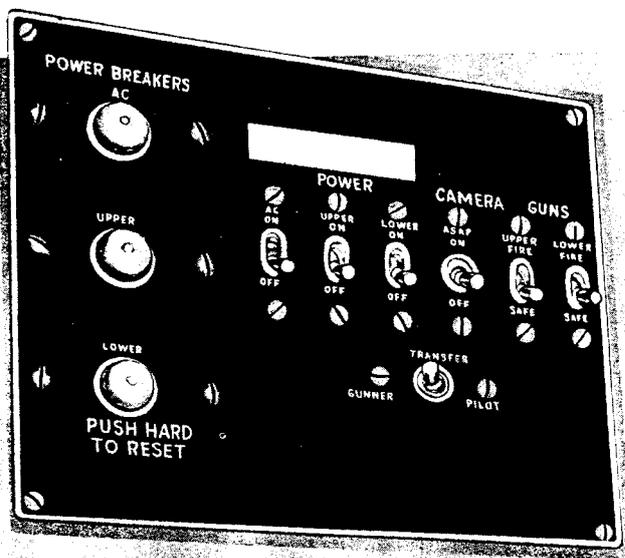
**Turret Control Panel.**

**A** and **B** The turret control panel (figure 4-25), located on the left sidewall in the forward left corner of the gunner's compartment, contains the protective circuits and switches for the turret system. The switches and circuit breakers are divided (as decalced) into POWER BREAKERS, POWER, CAMERA, GUNS, and TRANSFER. The power breakers are decalced AC, UPPER and LOWER and provide circuit protection for the A-C power, upper turret and lower turret. The power switches consist of an AC switch with ON and OFF positions, an upper switch with ON and OFF positions and a lower switch with ON and OFF positions. The AC switch places the turret system in a standby status (for scanning) when placed in the ON position. The upper and lower switches allow the turrets to automatically align with the sighting unit when placed in the ON position with the action switch engaged.

**CAUTION**

To avoid possible injury, turn on power switches according to instructions on control panel.

The camera switch, decalced G.S.A.P. with an ON and OFF position, supplies power to the gun camera when placed on ON. The camera operates in conjunction with the firing of the guns. Only aircraft with the Mark 33 sighting unit installed have the gun camera for the turret guns. The guns switch decalced UPPER with FIRE and SAFE positions places the upper turret guns in a standby status when placed in the FIRE



## TURRET CONTROL PANEL

2.1.2-2-42

Figure 4-25

position. The SAFE position disconnects power from the guns. The switch decaled LOWER performs the same functions for the lower turret as the upper switch does for the upper turret. The switch decaled TRANSFER with a PILOT and GUNNER position provides a means for transferring control of firing of the upper turret guns from the gunner to the pilot. Refer to GUN TRANSFER, this section.

### Turret Sighting Unit.

#### **A** and **B**

The turret sighting unit (figure 4-24) is mounted in the center of the gunner's compartment. A 50 to 75 degree cone field of vision is permitted by each of the two periscope sights. Change of the line of sight in elevation is accomplished by moving the sighting unit handles up or down. The field of vision is automatically changed to the upper hemisphere or the lower hemisphere by the turret sighting unit. Continuous rotation of the right-hand handle is the only requisite to move the line of sight through its entire change of elevation and depression. Azimuth change of sight is accomplished by rotating the turret sighting unit about its vertical axis. The turret sighting unit is equipped with a desiccator pump to control the humidity of the unit. An electrical circuit to the reticle provides for proper illumination of the reticle. Defrosting of the periscopes is accomplished by fluid from a one gallon container in the gunner's compartment. With the Mark 33 periscope sight a gun camera is installed on the turret sighting unit and operates in conjunction with gun firing.

#### **A** and **B**

**Turret Sighting Unit Latch Knob.** A turret sighting unit latch knob is installed near the bottom of the turret sighting unit to latch the turret sighting unit (and turret guns) in either the forward or aft position. This is accomplished by rotating the turret sighting unit and turrets to the desired position and pushing down on the latching knob.

#### **A** and **B**

**Reticle Lamp Rheostat.** A reticle lamp rheostat (3, figure 4-24), installed on the turret sighting unit, controls reticle brightness. The intensity of brightness at which the rheostat is set is dependent upon the prevailing atmospheric conditions.

#### **A** and **B**

**Desiccator Hand Pump.** A desiccator hand pump (1, figure 4-24), on the turret sighting unit is used to control the humidity within the turret sighting unit. Moisture can be prevented from forming or moisture can be eliminated from within the turret sighting unit by actuating the desiccator pump handle.

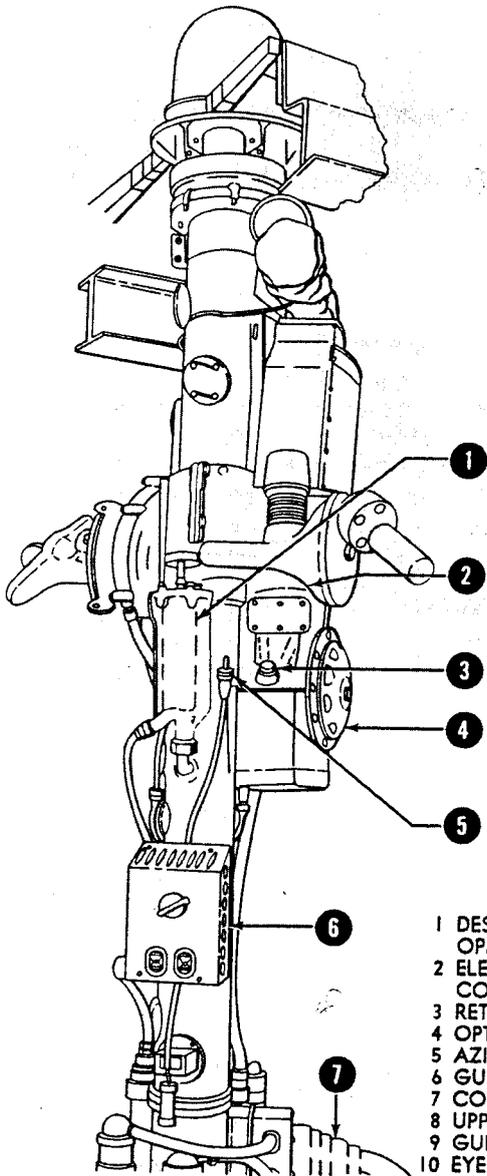
#### **A** and **B**

**Action Switch.** An action switch (17, figure 4-24), installed on the left handle of the turret sighting unit, controls operation of the turrets and gun firing. The action switch must be actuated before the turrets will move with the turret sighting unit or before the guns can be fired.

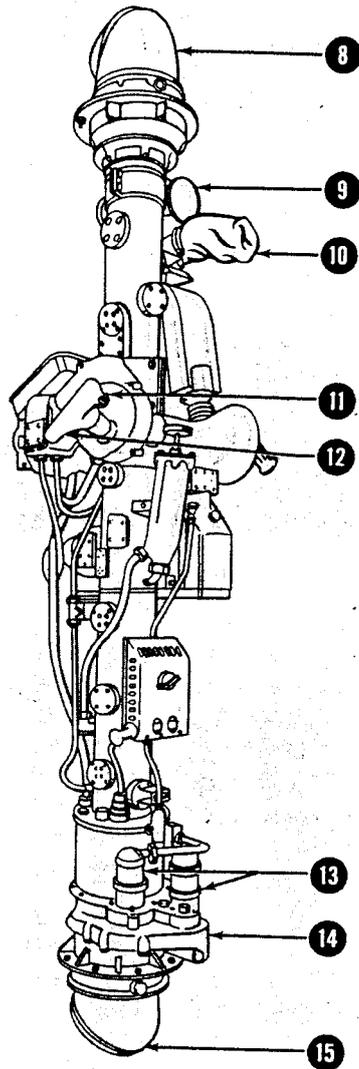
#### **A** and **B**

**Turret Guns Firing Trigger.** The turret guns firing trigger (18, figure 4-24), installed on the left handle of the turret sighting unit, is used by the gunner to fire

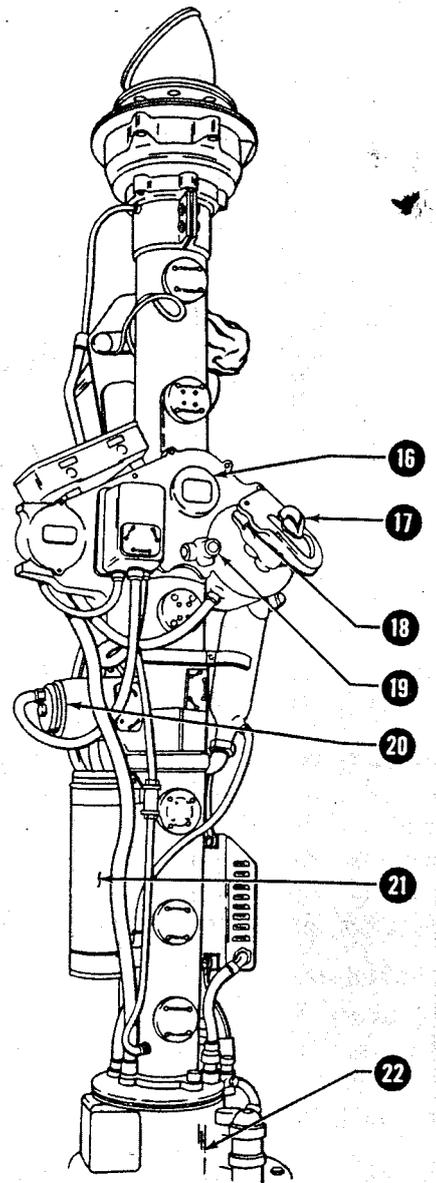
# TURRET SIGHTING UNIT



**VIEW A**



**VIEW B**



**VIEW C**

- 1 DESICCATOR HAND PUMP (ELECTRICALLY OPERATED ON SOME AIRCRAFT)
- 2 ELEVATION SELSYNS (IN BACK OF CONTROL HANDLE)
- 3 RETICLE LAMP RHEOSTAT
- 4 OPTICAL FILTER CONTROL
- 5 AZIMUTH GEAR LOCK
- 6 GUNNER'S SUIT HEATER PANEL
- 7 CONNECTOR
- 8 UPPER PERISCOPE HEAD
- 9 GUNNER'S HEAD PAD
- 10 EYE PIECE

- 11 GUNNER'S MICROPHONE SWITCH
- 12 CONTROL HANDLES
- 13 AZIMUTH SELSYNS
- 14 AZIMUTH GEAR BOX
- 15 LOWER PERISCOPE HEAD
- 16 ELEVATION UNIT
- 17 ACTION SWITCH
- 18 TURRET GUNS FIRING TRIGGER
- 19 ELEVATION GEAR LOCK
- 20 CHANGE-OVER MOTOR
- 21 DESICCATOR JAR
- 22 COLLECTOR ASSEMBLY

2.1.2-2-85

**Figure 4-24**

the turret guns. When the action switch closes the firing circuits and the trigger is depressed, the ammunition booster will start, and the guns will fire.

#### Turret Gun Operation.

**A** and **B**

1. Gun switches—FIRE.
2. Transfer switch—GUNNER.
3. Azimuth, elevation and seat locks—Unlatch.
4. Action switch—Engage.
5. Target—Track, allowing for lead and angle of deflection.

#### Note

The sight is non-compensating.

6. Gun trigger—Depress.

#### Gun Transfer Operation.

**A** and **B**

#### Note

This procedure is used on aircraft with a "flat-top" canopy.

1. Action switch—Engage.
2. Turret sighting unit—Move to horizontal and forward position.
3. Turret sighting unit latch knob—Push down.
4. Transfer switch—PILOT.
5. Upper power switch—OFF.

#### Note

To operate and fire lower turret, unlatch turret sighting unit, depress action switch, estimate correction, and depress trigger.

#### To Stow Turrets.

**A** and **B**

1. Action switch—Engage.
2. Turret sighting unit—Move to horizontal and aft position.
3. Turret sighting unit latch knob—Push down.
4. Upper power switch—OFF.
5. Lower power switch—OFF.
6. A-C power switch—OFF.
7. All switches—OFF or SAFE.

#### BOMBING SYSTEM.

The electrically controlled bombing system includes provisions for carrying bombs internally in the bomb bay and externally on racks under each wing. In **A**

and **C** aircraft, the bombing system is controlled during normal operation from the pilot's compartment. In **B** and **D** aircraft the bombing system may be controlled from the pilot's compartment or the navigator-bombardier's compartment. Emergency bomb release is provided by salvo switches in the pilot's and gunner's compartments on **A** and **C** aircraft, and in the pilot's, gunner's and navigator-bombardier's compartments on **B** and **D** aircraft. Electrical power for the bombing system is obtained from the 28-volt D-C bus bar.

#### BOMB BAY DOORS.

The bomb bay doors are hydraulically operated and electrically controlled during normal operation. In the event the electrical system fails, the doors can be operated by the bomb bay door manual handle, or by placing the emergency hydraulic selector valve lever to the BOMB DOORS OPEN position and actuating the hydraulic hand pump. After the bomb bay doors are opened move emergency hydraulic selector valve lever to the SYSTEM position. Hydraulically actuated bomb bay spoilers, installed in a slot between the bomb bay and the nose wheel well, operate in conjunction with the bomb bay doors. The spoilers, designed to break up the airstream into the bomb bay, extend completely before the doors open and retract only after the doors completely close. Safety switches, mechanically connected to each bomb bay door, prevent inadvertent release of bombs before both bomb bay doors are fully opened.

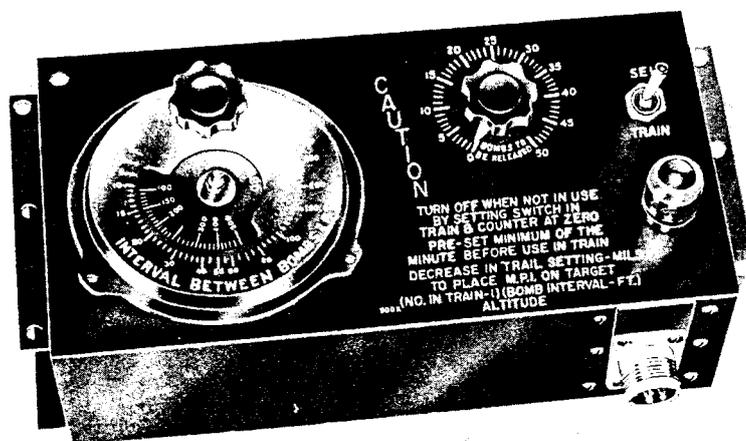
The bomb bay is equipped to carry several combinations of bomb loads. The forward bomb bay section has seven bomb stations on each side and the aft bomb bay section has five stations on each side. Provisions are made for carrying demolition bombs, weighing up to 500 pounds each, under each wing.

#### Bomb Bay Door Switch

A bomb bay door switch (7, figure 1-24), with OPEN BOMB DOORS, OFF, and CLOSE BOMB DOORS positions, is installed on the pilot's main electrical panel. A similar switch is installed on the navigator-bombardier's control panel on **B** and **D** aircraft. When the switches are placed at OPEN BOMB DOORS or CLOSE BOMB DOORS, a solenoid unit built into the bomb bay doors position selector valve is actuated to open or close the doors. Electrical power is supplied from the 28-volt D-C bus bar through circuit breakers on the pilot's circuit breaker panel for both of these switches.

#### Bomb Bay Door Manual Handle.

A bomb bay door manual handle (26, figure 1-23), installed on the bomb bay doors position selector valve at the aft end of the pilot's compartment, is used to operate the bomb bay doors in event of failure of the electrically operated solenoids. The handle has OPEN, N (neutral), and CLOSE positions. The raised



## B-3A BOMB INTERVALOMETER

2. 1. 2-2-84

Figure 4-26

center portion of the handle must be depressed before the handle can be moved. During normal operation of the bomb bay doors the handle is positioned to N.

### GUN-BOMB SIGHT.

A gun-bomb sight (3, figure 1-5) is installed on the pilot's instrument panel glare shield. The gun-bomb sight is equipped with a tilted reflector head which is used for low altitude bombing. The reflector glass can be quickly set to give any depression angle to line of sight from 1 to 13 degrees. This is accomplished by turning the knob located on the side of the reflector head. The tilting reflector head incorporates azimuth and elevation boresighting adjustments. A light, located behind the reticle, supplies illumination for the reticle pattern. The light is operated from the 28-volt D-C bus bar through a circuit breaker on the pilot's circuit breaker panel and controlled by a light filament selector switch and rheostat in the pilot's compartment.

### Gun-Bomb Sight Light Filament Selector Switch.

A gun-bomb sight light filament selector switch (23, figure 1-5), installed on the left side of the pilot's compartment below the pilot's fire control panel, provides two circuits for illuminating the sight reticle. The switch has FIL 1 and FIL 2 positions. Either position of the switch supplies power from the 28-volt D-C bus bar to the light, therefore should the light fail in one position the light will continue to operate when the switch is placed in the other position.

### Gun-Bomb Sight Reticle Rheostat.

A gun-bomb sight reticle rheostat (24, figure 1-5) installed on the left side of the pilot's compartment below the pilot's fire control panel, is used to control brilliance of the sight light. When the rheostat with ON and OFF positions, is rotated from OFF towards

BRIGHT, the light is turned on and the intensity of the light increases.

### NORDEN BOMBSIGHT.

#### **B** and **D**

A Norden bombsight (2, figure 4-9), type M-9, can be installed in the nose of aircraft equipped with a bombardier nose for medium altitude precision bombing. The bombsight is employed to determine the dropping angle at which the bombs should be released, and the course on which the aircraft should be flown to obtain a direct hit on the target. This is accomplished mechanically by setting up a line of sight between the aircraft and the target and measuring the angle which the line of sight makes with the vertical. Gyroscopic stabilization is employed to permit instantaneous and continuous measurements of the angles which exist between the line of sight and the true vertical. To do this the line of sight must be maintained on the target. Controls for operating the bombsight are located on the sight. The bombsight receives power from the 28-volt D-C bus bar through a circuit breaker on the pilot's circuit breaker panel.

### B-3A BOMB INTERVALOMETER.

The B-3A bomb intervalometer (figure 4-26) is installed at the aft end of the pilot's control pedestal on **A** and **C** aircraft, and on the right side of the navigator-bombardier's compartment on **B** and **D** aircraft. It is a timing device used to actuate either selectively, or in train, electrical bomb release mechanisms at preset intervals of 1 to 20 seconds. The intervalometer receives power from the 28-volt D-C bus bar through a circuit breaker on the pilot's circuit breaker panel.