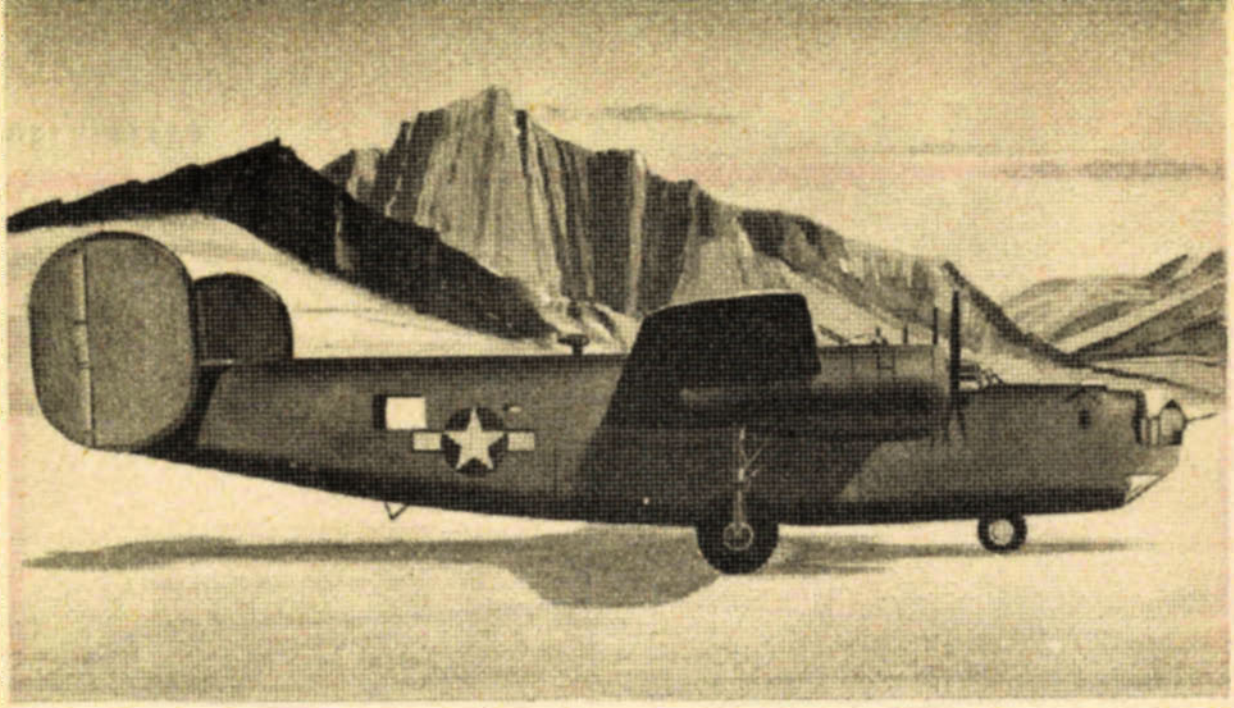
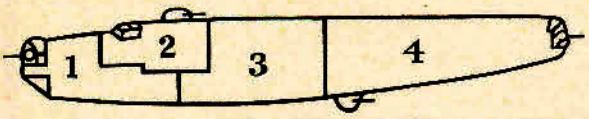


GENERAL DESCRIPTION

The B-24 is a midwing, land, heavy bombardment airplane of the following approximate over-all dimensions: length 67 feet, 2 inches; height 17 feet, 11 inches; span 110 feet. Weight varies from a basic weight of approximately 38,000 lb. to combat loads of over 60,000 lb.

Compartments



1. Bombardier-navigator's compartment, in the nose of the airplane, contains navigational equipment, bombsight, bomb controls, and nose guns, or in the case of later models, nose turret.

2. Flight deck includes pilots' compartment, radio operator's station and top gun turret.

3. Two bomb bays are in the center of the fuselage under the center wing section. Half deck is located above the rear bomb bay.

4. Rear fuselage compartment contains lower gun turret, waist guns, bottom camera hatch, and photographic equipment. Tail gun turret is in the extreme rear of the fuselage.

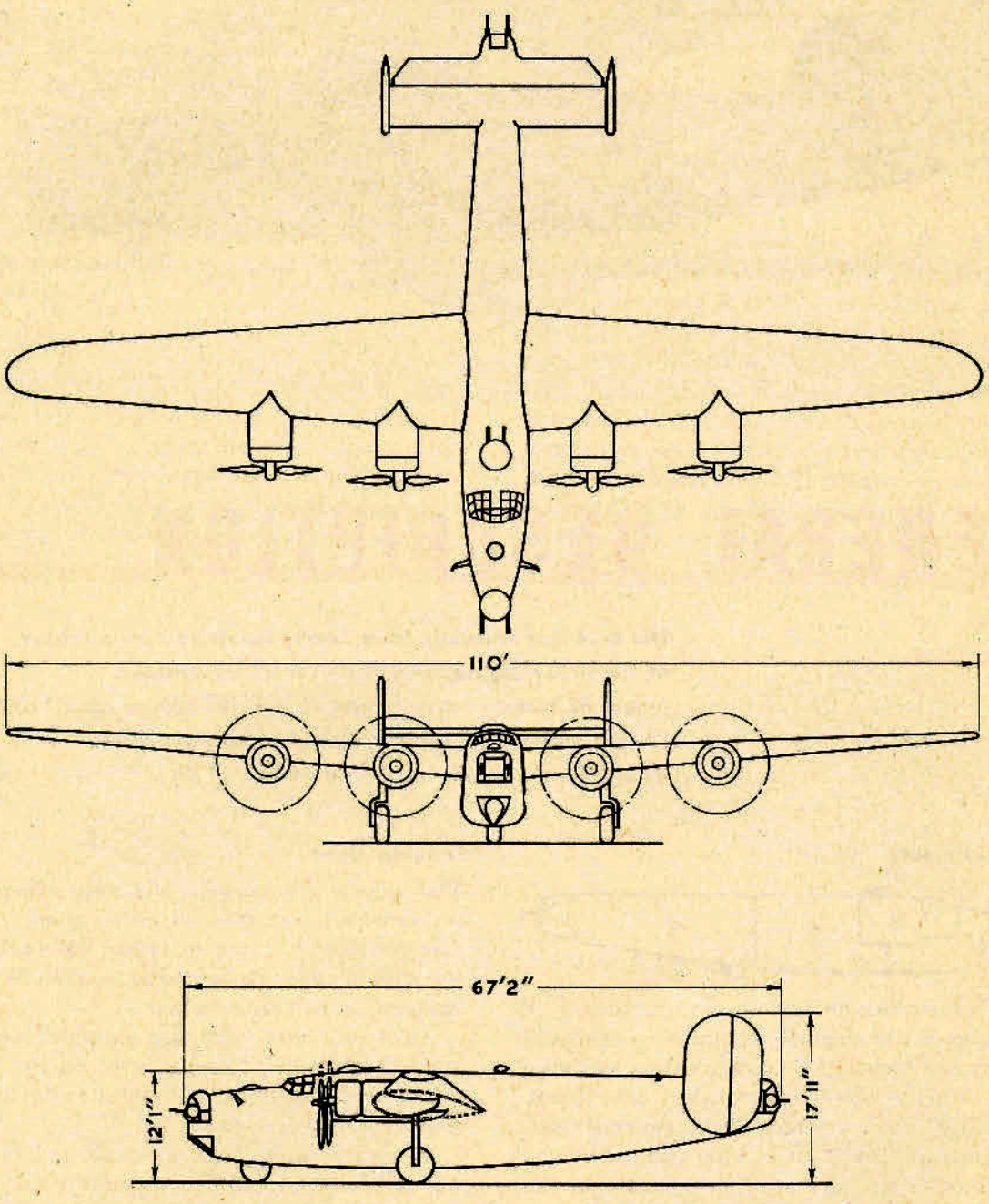
Landing Gear

The tricycle gear consists of 2 main wheels and a nosewheel, mounted on air-oil shock struts. The nosewheel is free to swivel 45° each way but should never be turned more than 30°; it is damped against shimmying.

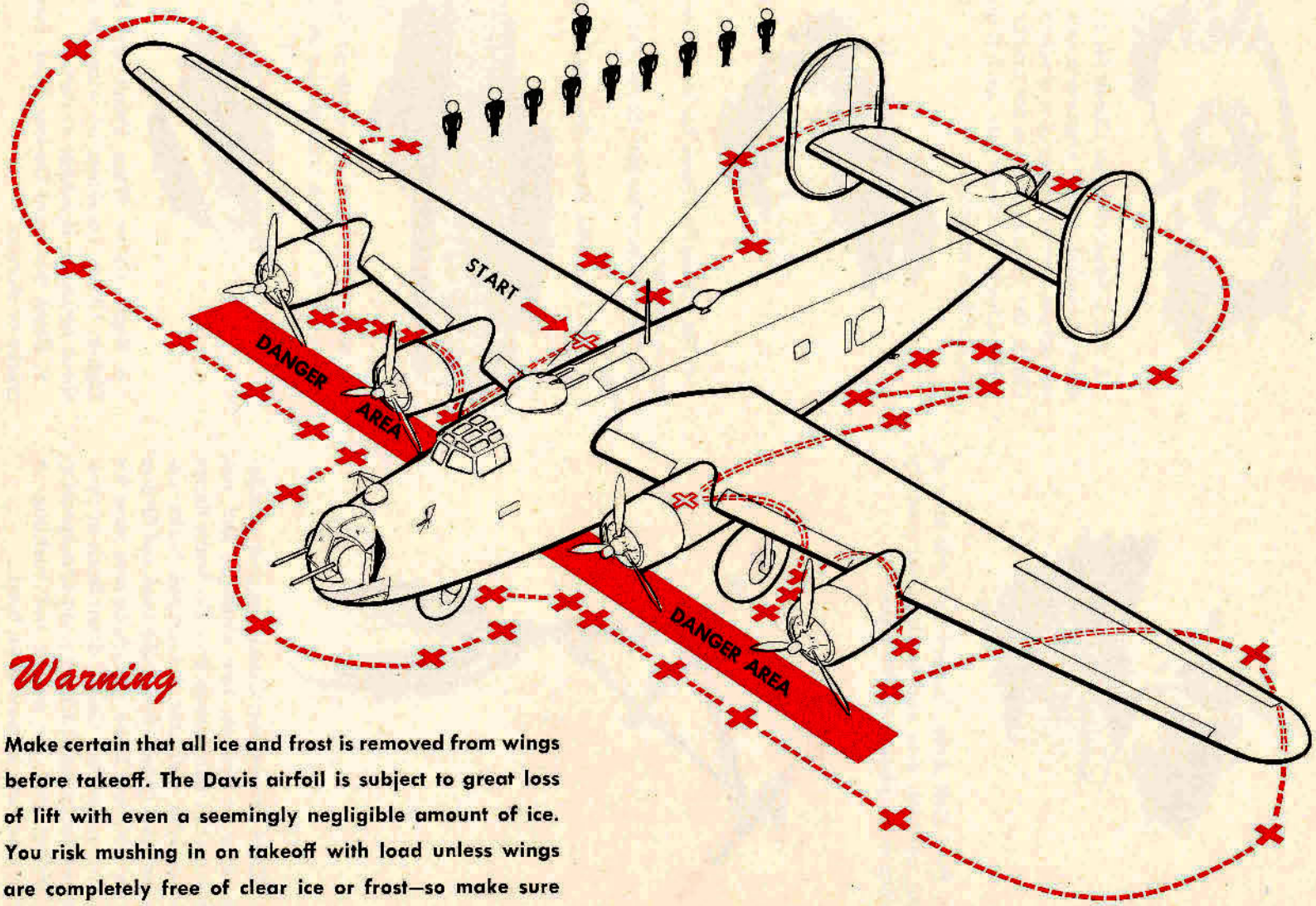
All 3 units are normally extended and retracted hydraulically by a lever on the pilot's control pedestal which also operates the landing gear locking mechanism.

The retractable shock-mounted tail bumper (or tailskid) is operated simultaneously with the landing gear (B-24 C's and early B-24 D's have non-retractable tail bumpers).

The inherent directional stability of the tricycle gear is an important aid to the pilot during taxiing, takeoff, landing operation in crosswinds, and with blown tires.


110'
67'2"
12'1"
17'11"

SEQUENCE FOR EXTERNAL CHECK



Warning

Make certain that all ice and frost is removed from wings before takeoff. The Davis airfoil is subject to great loss of lift with even a seemingly negligible amount of ice. You risk mushing in on takeoff with load unless wings are completely free of clear ice or frost—so make sure they are clean!

RESTRICTED

Equipment and Systems

The various types of equipment and systems such as the fuel, oil, hydraulic, and other systems are described in detail in separate sections of this manual. Specific and complete practical understanding of these systems is imperative for the pilot because of the emergencies which arise in combat operations.

Armament

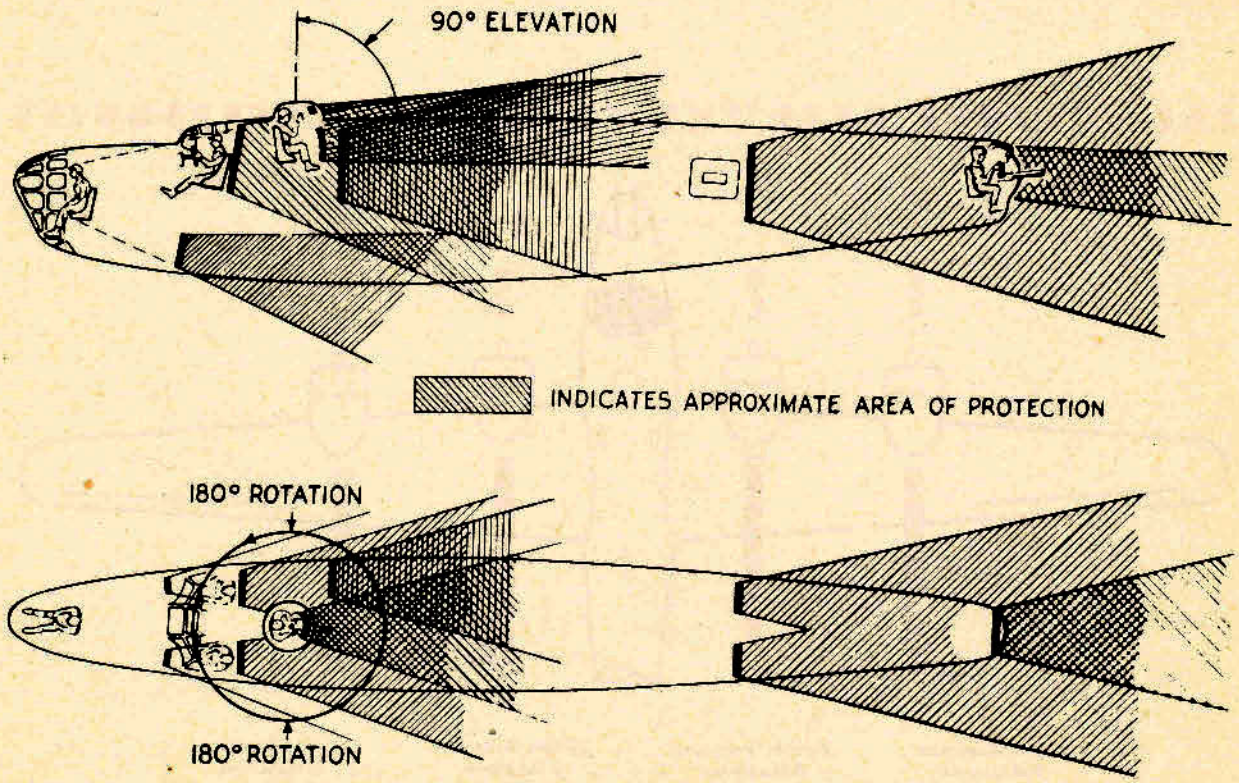
Protective armor plate and guns are provided at crew stations as shown in the accompanying illustrations.

Davis Wing

The B-24 wing is an internally braced, skin-stressed type, tapered, with a high aspect ratio. It is considered one of the most efficient airfoils ever developed and was a radical departure from airfoils in use when the Liberator was designed. Its unusual efficiency accounts for the combination of high speed, long range and great load-carrying qualities of the airplane. Flaps greatly vary the lift-drag characteristics of the wing, as is evidenced by the fact that normal takeoffs are made with 20° of flaps, that maximum lift and stability at slow cruising speeds can be obtained with 5° to 9° of flaps, and that 10°, 20°, and 40° of flaps effect successively larger reductions in stalling speeds.

Propellers

The 3-bladed propellers are Hamilton-Standard, hydromatic, full-feathering, controllable pitch, constant-speed. Toggle switches on the pilot's pedestal electrically control the governors which maintain the constant-speed feature. To operate the B-24 safely it is imperative that pilots fully understand the principle of the constant-speed propeller, its relationship to engine pressures (manifold pressure and brake mean effective pressure) and know when and when not to use the feathering feature.



Armament and Angles of Armor Protection Diagram B-24D

Ignition

Engine ignition is provided by 2 American Bosch magnetos, mounted on the rear section of each engine. Separate switches permit either one or both magnetos to be operated on the engine. Battery switches are on the copilot's auxiliary switch panel. A master switch bar located just above the magneto switches is available for simultaneously shorting the primaries of all magnetos and for opening the battery circuit of the main electrical system.

Cowl Flaps

Engine cooling is regulated by means of adjustable cowl flaps which are controlled electrically from the pilot's pedestal. The range of cowl flap control is from closed to 12¼° to 30° open, depending on the model airplane.

Carburetors

On No. 42-41115 and subsequent aircraft the Bendix Stromberg carburetor is replaced by the Chandler Evans Co. (Ceco) carburetor.

Engines

The B-24 is equipped with 4 Pratt & Whitney 14-cylinder, twin-row radial, air-cooled engines with internal single-stage, single-speed, engine-driven integral superchargers. Engines are rated to produce up to a total of 4800 horsepower using Grade 100 fuel and takeoff power settings.

Each of the 4 engines is equipped with a turbo-supercharger to furnish compressed air to the fuel induction system at sea-level pressure.

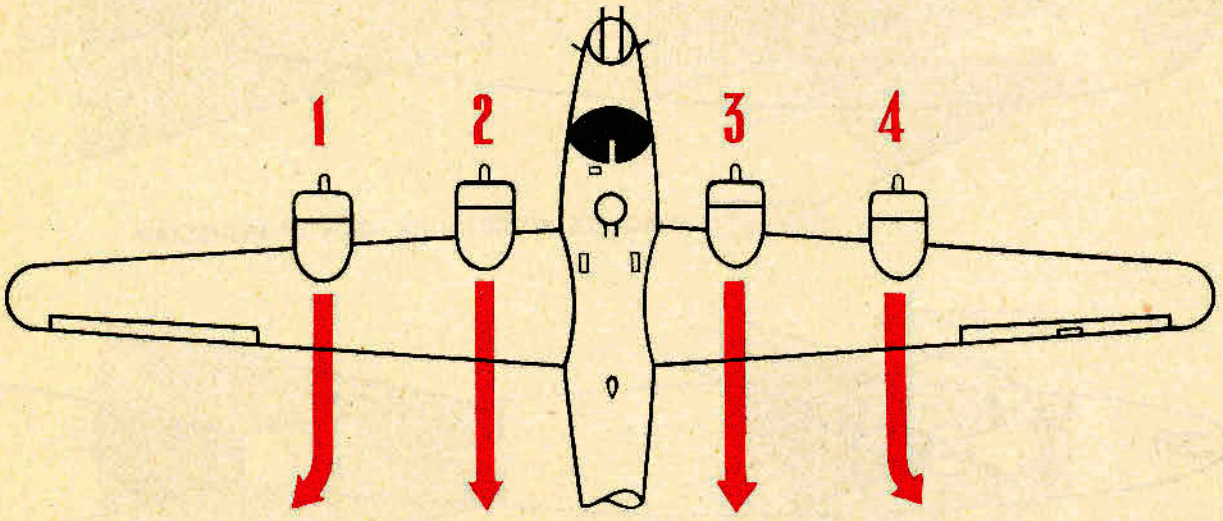
Control Surfaces

Rudders, elevators and ailerons are equipped with trim tabs (except left aileron) and are fabric covered; all other surfaces are metal covered.

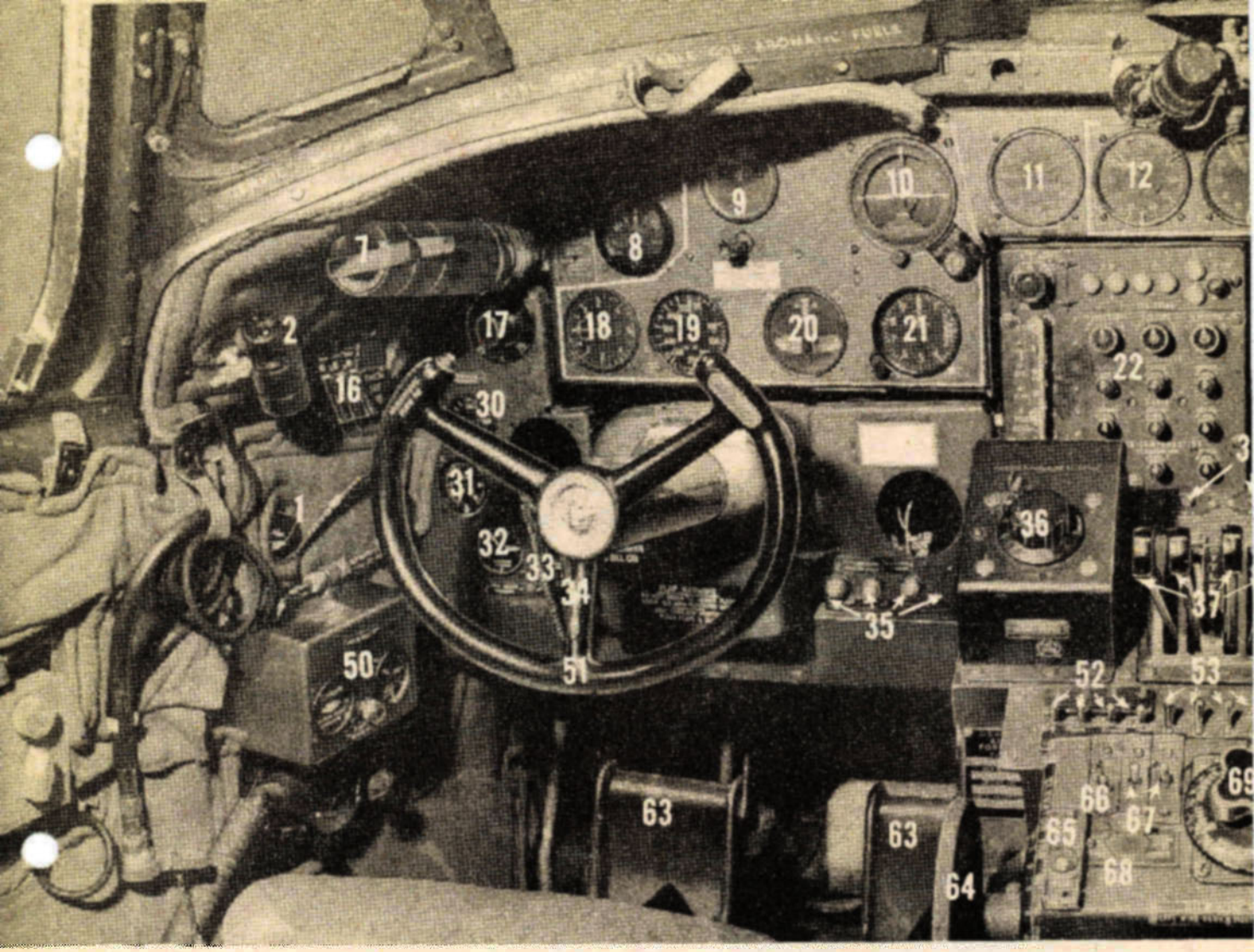
Wing Flaps

The all-metal, Fowler-type wing flaps retract into the wing center section trailing edge wells. Maximum down travel is 40°.

THE ENGINES HAVE THE FOLLOWING ACCESSORIES

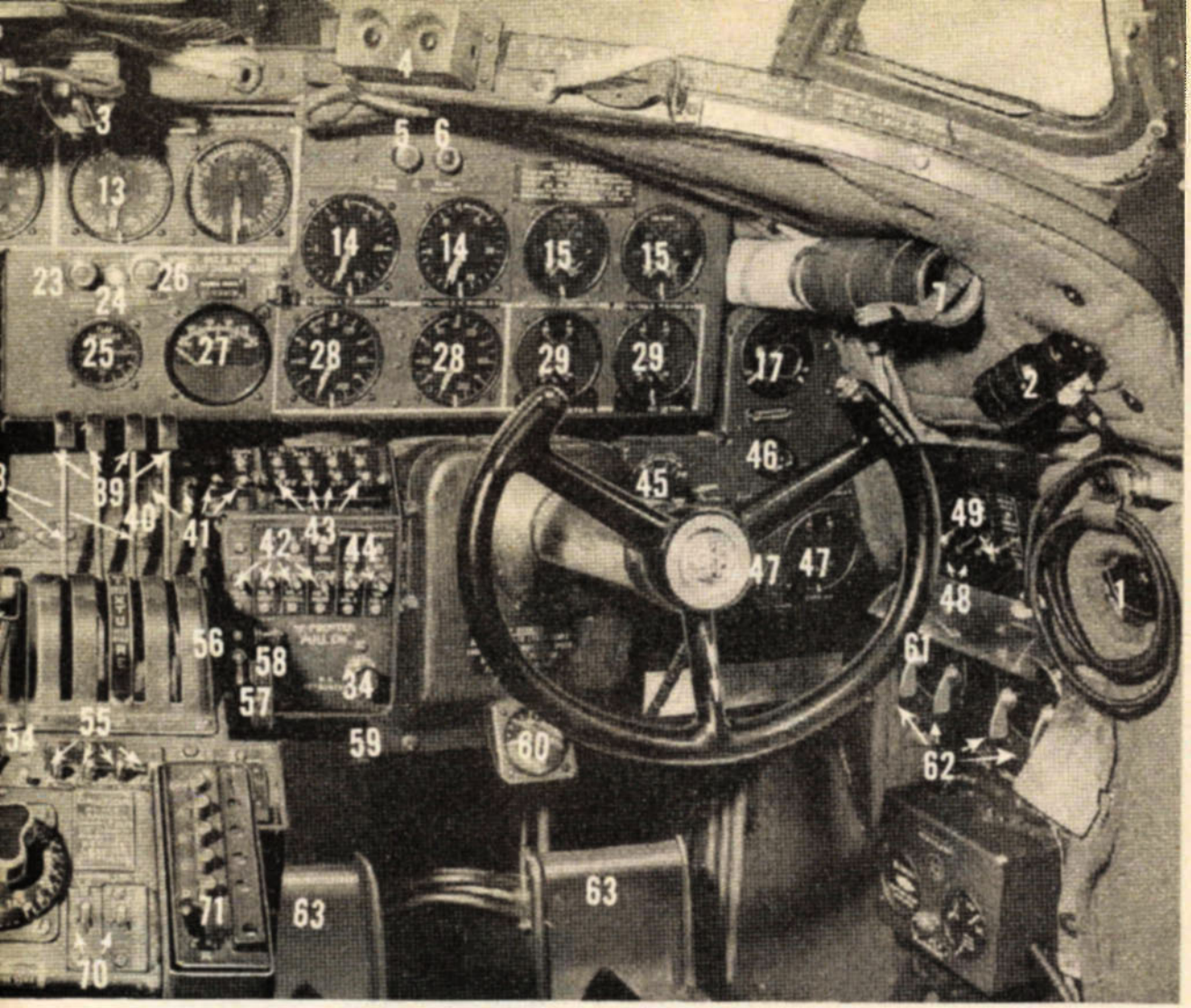


1	2	3	4
Electric Generator	Electric Generator	Electric Generator	Electric Generator
2 Magnetos	2 Magnetos	2 Magnetos	2 Magnetos
Fuel Pump	Fuel Pump	Fuel Pump	Fuel Pump
Turbo-supercharger	Turbo-supercharger	Turbo-supercharger	Turbo-supercharger
Vacuum Pump	Vacuum Pump	Hydraulic Pump	



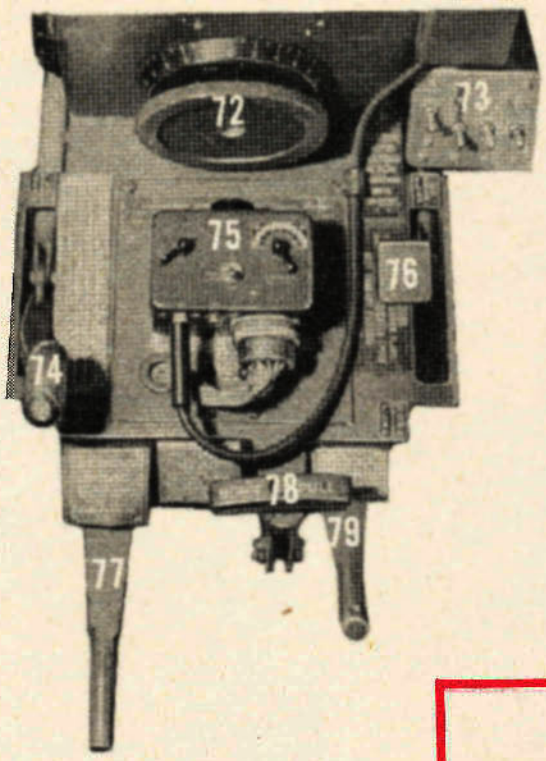
Cockpit of the Liberator . . . B-24 PI

1. Fluorescent Light Switches
2. 24 Volt DC Fluorescent Light
3. Magnetic Compass Light Rheostat
4. IFF Radio Destroyer Switch
5. Bomb Doors Indicator
6. Bomb Release Indicator
7. Defroster Ducts
8. Pilot Director Indicator
9. Directional Gyro
10. Gyro Horizon
11. Radio Compass Indicator
12. Manifold Pressure Gages
13. Tachometers
14. Fuel Pressure Gages
15. Cylinder Temperature Gages
16. Chemical Release Switches
17. Ventilators
18. Rate-of-climb Indicator
19. Airspeed Indicator
20. Turn and Bank Indicator
21. Altimeter
22. C-1 Automatic Pilot
23. Marker Beacon Indicator
24. Landing Gear Indicator Test Button
25. Flap Position Indicator
26. Landing Gear Indicator
27. Free Air Temperature Gage
28. Oil Pressure Gages
29. Oil Temperature Gages
30. Hydraulic Pressure Gages
31. Suction Gage
32. Inboard Brake Pressure Gage
33. Outboard Brake Pressure Gage
34. Defroster Controls
35. Propeller Governor Limit Lights
36. Turbo Boost Selector



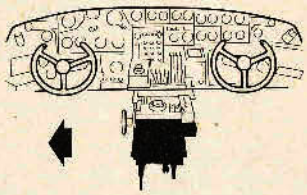
OT'S INSTRUMENTS AND CONTROLS

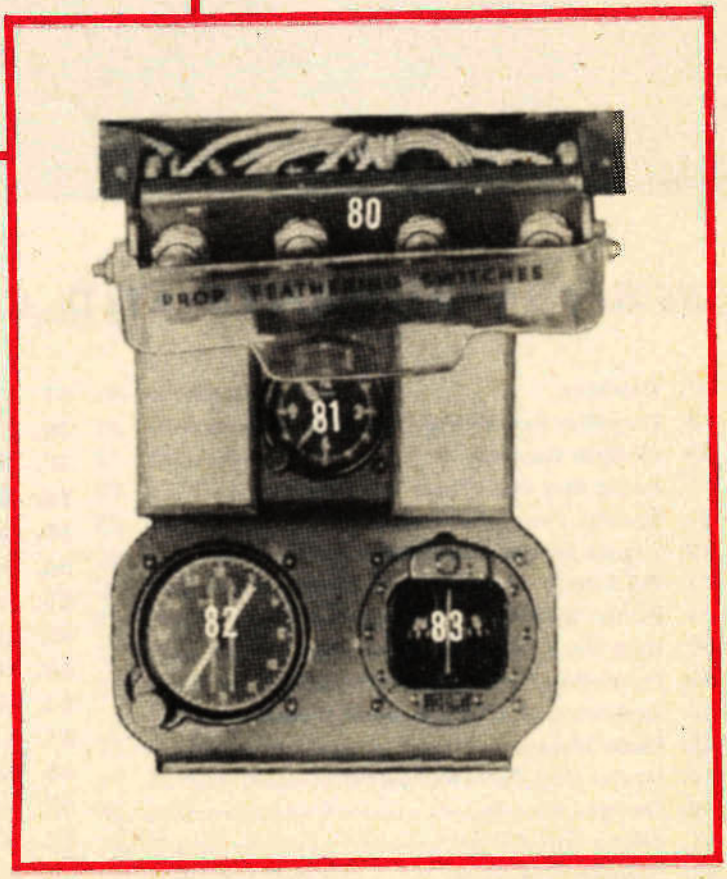
37. Throttles
38. Propeller Feathering Circuit Breakers
39. Mixture Controls
40. Bomb Bay Fuel Transfer Switch
41. Booster Pump Switches
42. Engine Starter Switches
43. Oil Dilution Switches
44. Primer Switches
45. Anti-icer Control
46. Formation Lights Rheostat
47. Carburetor Air Temperature Gages
48. Main Storage Battery Switches
49. Heater and Defroster Switches
50. Oxygen Panels
51. Pilot's Wheel
52. Propeller Switches
53. Intercooler Shutter Switches
54. Pitot Heater Switch
55. Cowl Flap Switches
56. SCR 535 Power Switch
57. Throttle Friction Lock
58. SCR 535 Emergency Switch
59. De-icer Control
60. De-icer Pressure Gage
61. Emergency Ignition Switch Bar
62. Ignition Switches
63. Brake Pedals
64. Elevator Tab Control Wheel
65. Alarm Button
66. Passing Light Switch
67. Navigation Light Switches
68. A C Inverter Switch
69. Rudder Tab Control Knob
70. Landing Light Switches
71. SCR 522 Control Box

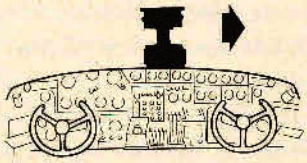


72. Aileron Tab Control Wheel
73. Recognition Light Switches
74. Landing Gear Control Lever
75. Command Radio Transmitter Control Box
76. Wing Flap Control Lever
77. Parking Brake Handle
78. Emergency Bomb Release Handle
79. Controls Lock Handle

BASE OF CONTROL PEDESTAL

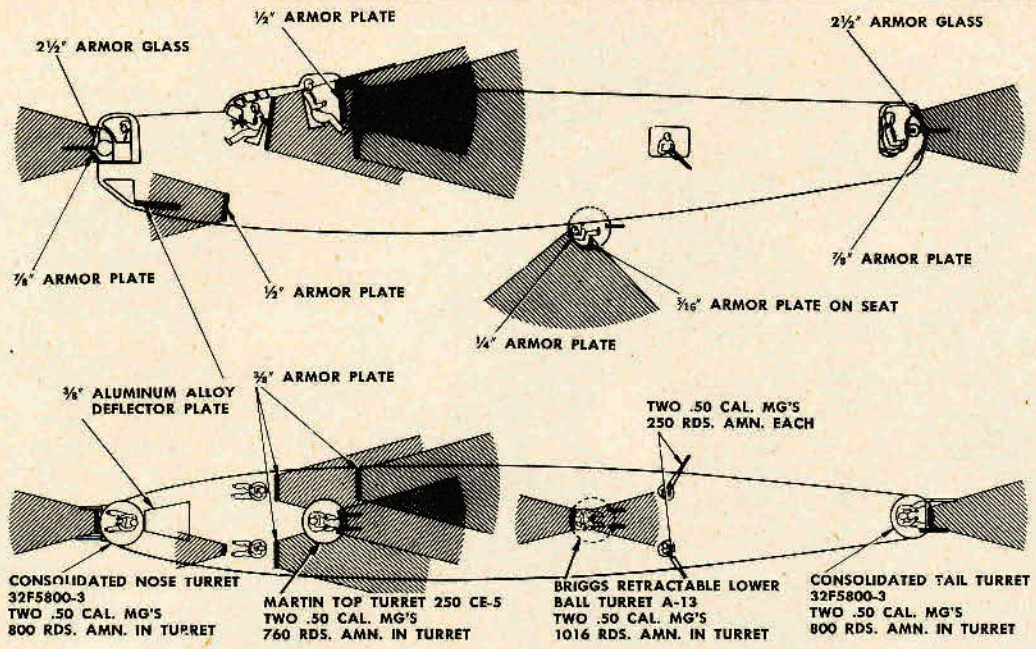




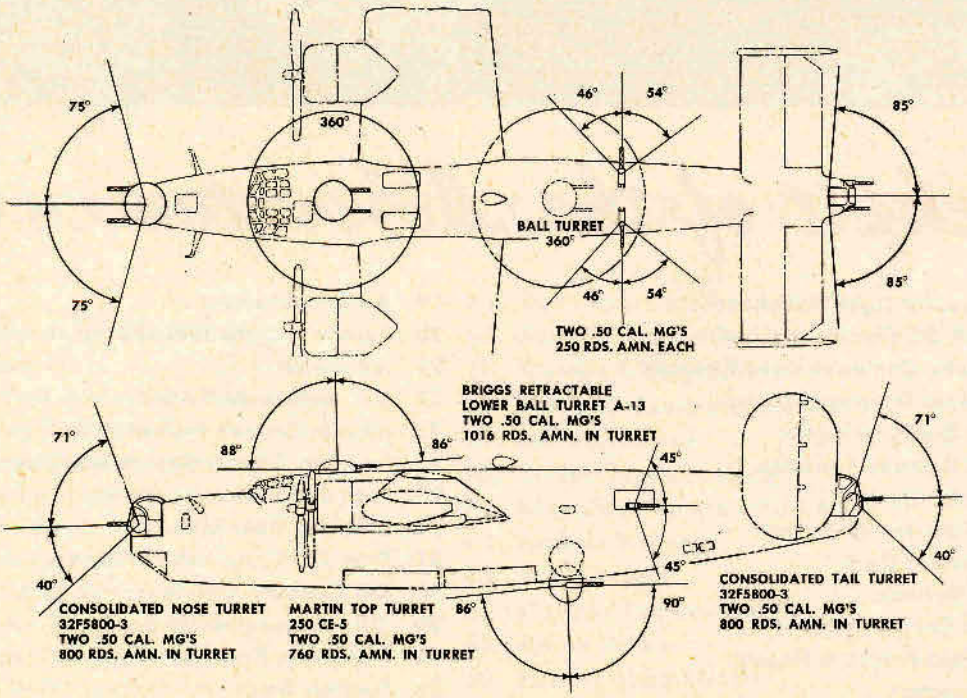


ABOVE INSTRUMENT PANEL

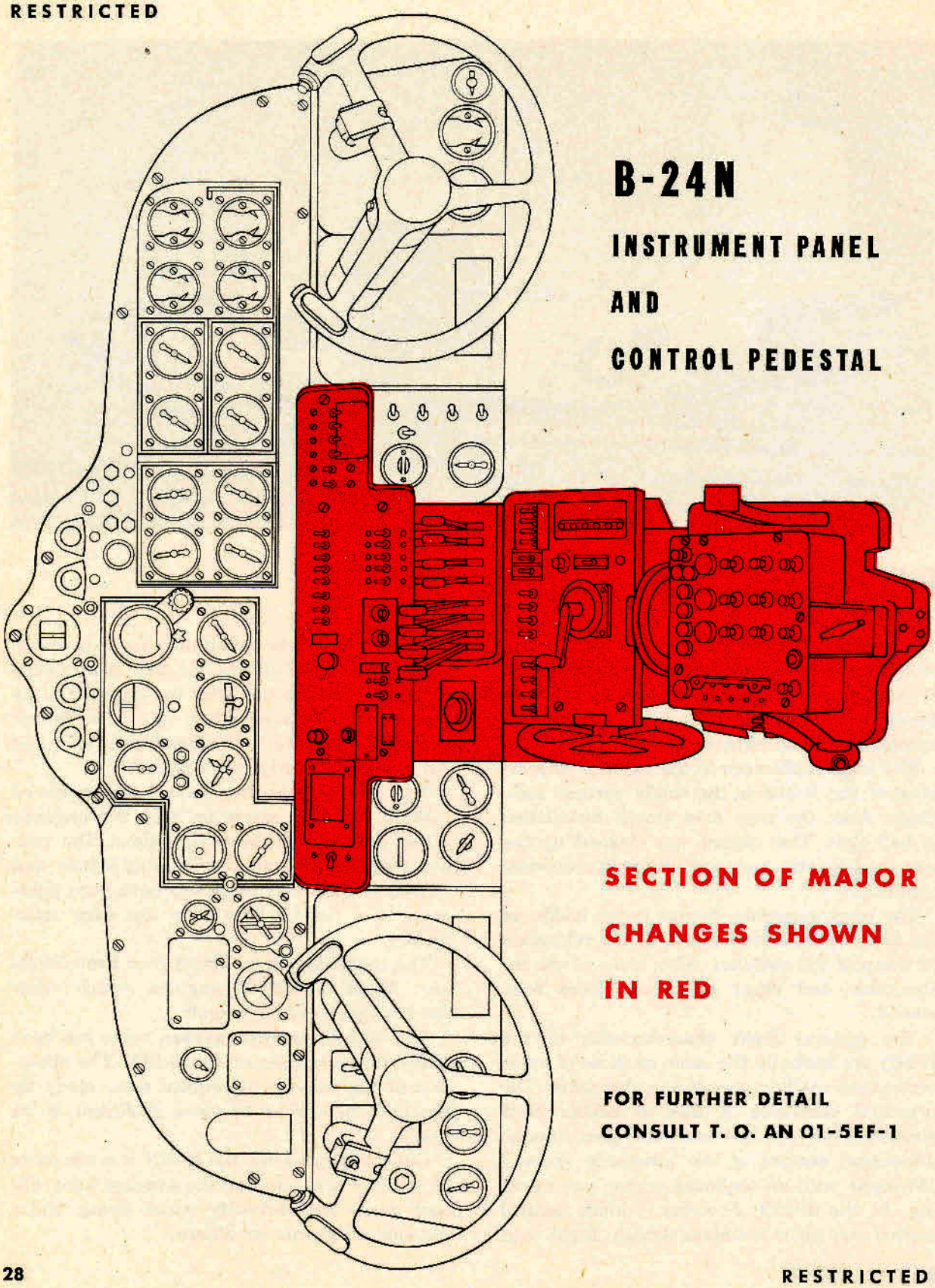
80. Propeller Feathering Switches
81. Clock
82. Remote Indicating Compass
83. Magnetic Compass



Defensive Armament and Angles of Armor Protection—B24J



Angles of Fire—B24J



B-24N

INSTRUMENT PANEL AND CONTROL PEDESTAL

SECTION OF MAJOR CHANGES SHOWN IN RED

FOR FURTHER DETAIL CONSULT T. O. AN 01-5EF-1