Missile Launch/Missile Officer
Missile Fundamentals Branch
Department of Missile Training
Sheppard Air Force Base, Texas

OBR1821/3121B-3-I-15-P1
Student Workbook
6 December 1961

DAY 17A

HYDRAULIC SYSTEM AND COMPONENT FAMILIARIZATION

OBJECTIVE:

To familiarize you with the basic hydraulic system components and their functions.

MATERIALS REQUIRED:

Basic Hydraulic Trainer.

PROCEDURE:

1. Identify and explain the function of each component of the basic hydraulic system trainer.

NOMENCLATURE	FUNCTION
Reservoir	Store fluid
Pump	move "
Check Valve	one direction flow
accumulator	dampen surges
Relief Valve	Extra pressure
Selector	select function
actuator	move
filter	impurities

FOR INSTRUCTIONAL PURPOSES ONLY

2. Determine the answers for the problems below.

a. How much force is applied to a piston rod if the pressure on the piston is 3000 PSI (pounds per square inch) and the diameter of the piston is six inches?

$F = P \cdot A$

$F = 3000 \cdot 9\pi$

$F = 27{,}000\pi$

$f =$

b. On a simple hydraulic system we have a piston-type pump and a piston actuator. The pump piston has an area of three square inches and the actuator piston has an area of nine square inches. The pump piston travels a distance of three inches each second, exerting a force of 6,000 pounds.

$a = 3$
$A = 9$
$d = 3$
$F = 6000\#$

(1) How far does the actuator piston travel each second?

$D = \frac{ad}{A} = \frac{3 \cdot 3}{9}$ $D = 1$ in

(2) What is the force on the actuator piston?

$F = 18{,}000$ $F = 6{,}000$ #

(3) What is the mechanical advantage of the actuator over the pump?

$MA = \frac{3}{1}$

3. Identify and explain the function of each of the lettered items shown in Figures 1, 2, and 3 by completing each of the following blanks.

ITEM	NOMENCLATURE	FUNCTION
A.	Reservoir	
B.	Pump	
C.	check valve	
D.	relief valve	
E.	accumulator	
F.	selector	
G.	actuator	
H.	Vent	
I.	diaphram	
J.	outlet	
K.	Reservoir	
L.	check valve	
M.	accumulator	
N.	relief valve	
O.	accumulator	
P.	Selector	
Q.	Pump	

ITEM	NOMENCLATURE	FUNCTION
R.	actuator	
S.	Filter	
T.	accumulator	
U.	Filter	
V.	check valve	
W.	reservoir	

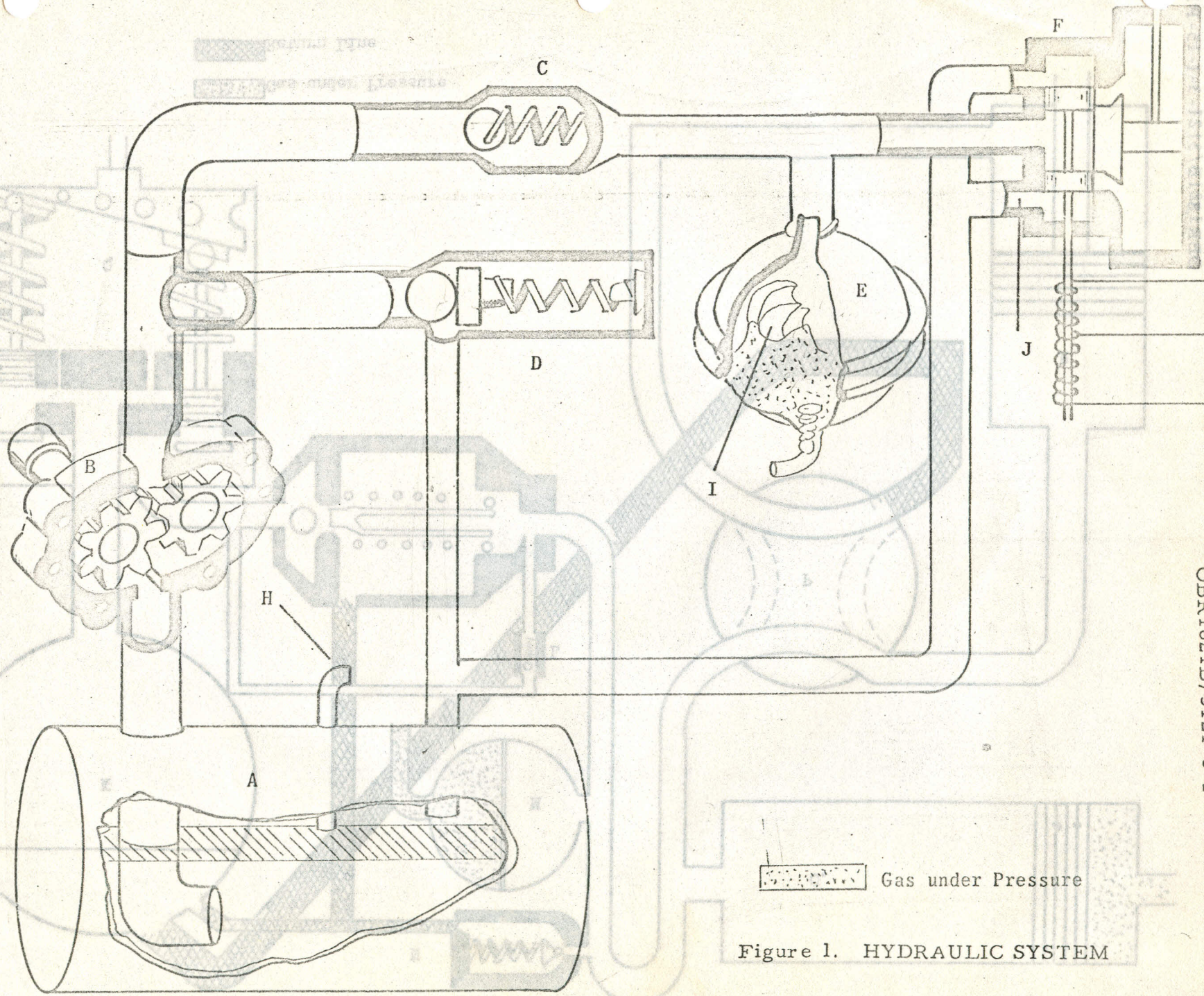

Figure 1. HYDRAULIC SYSTEM

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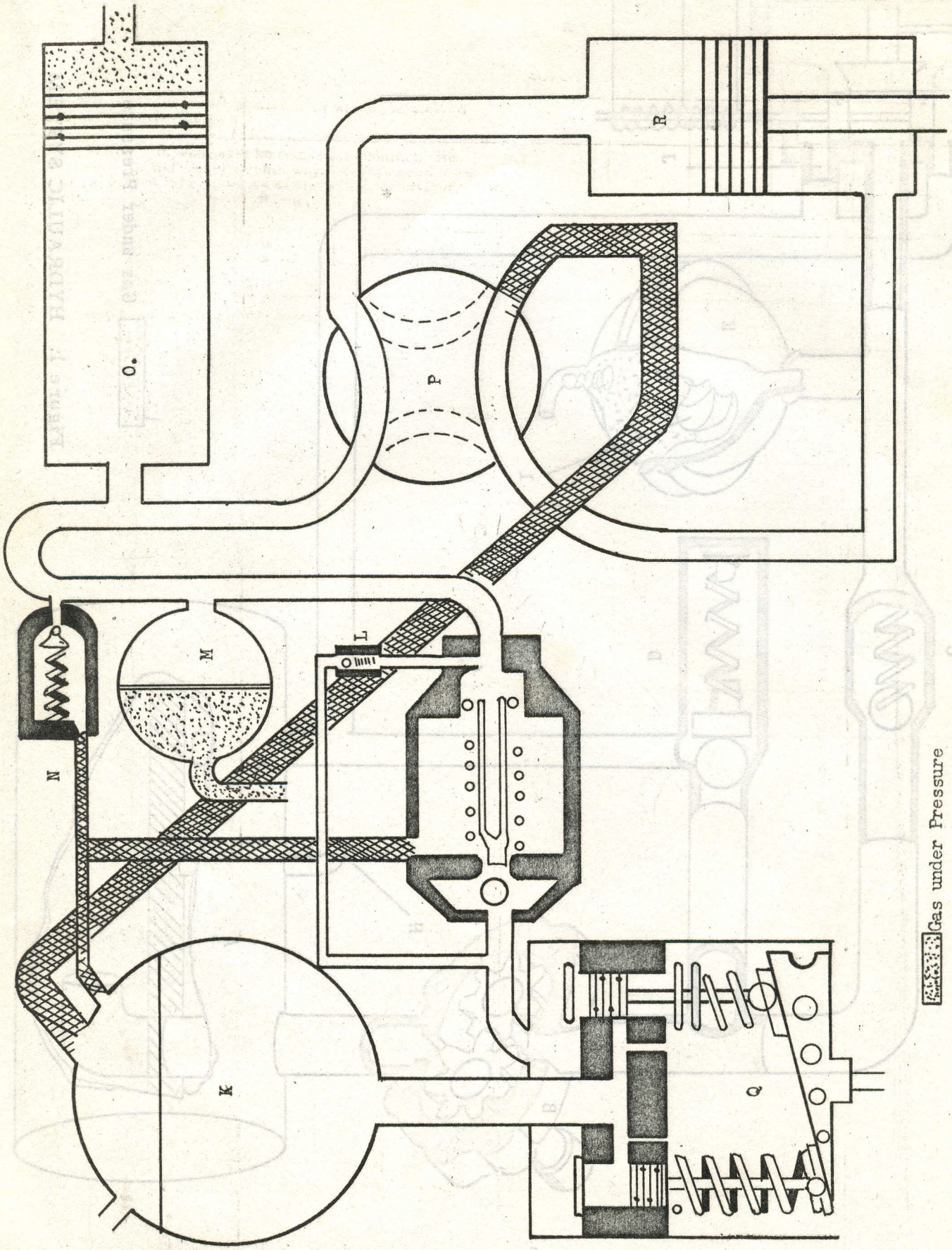

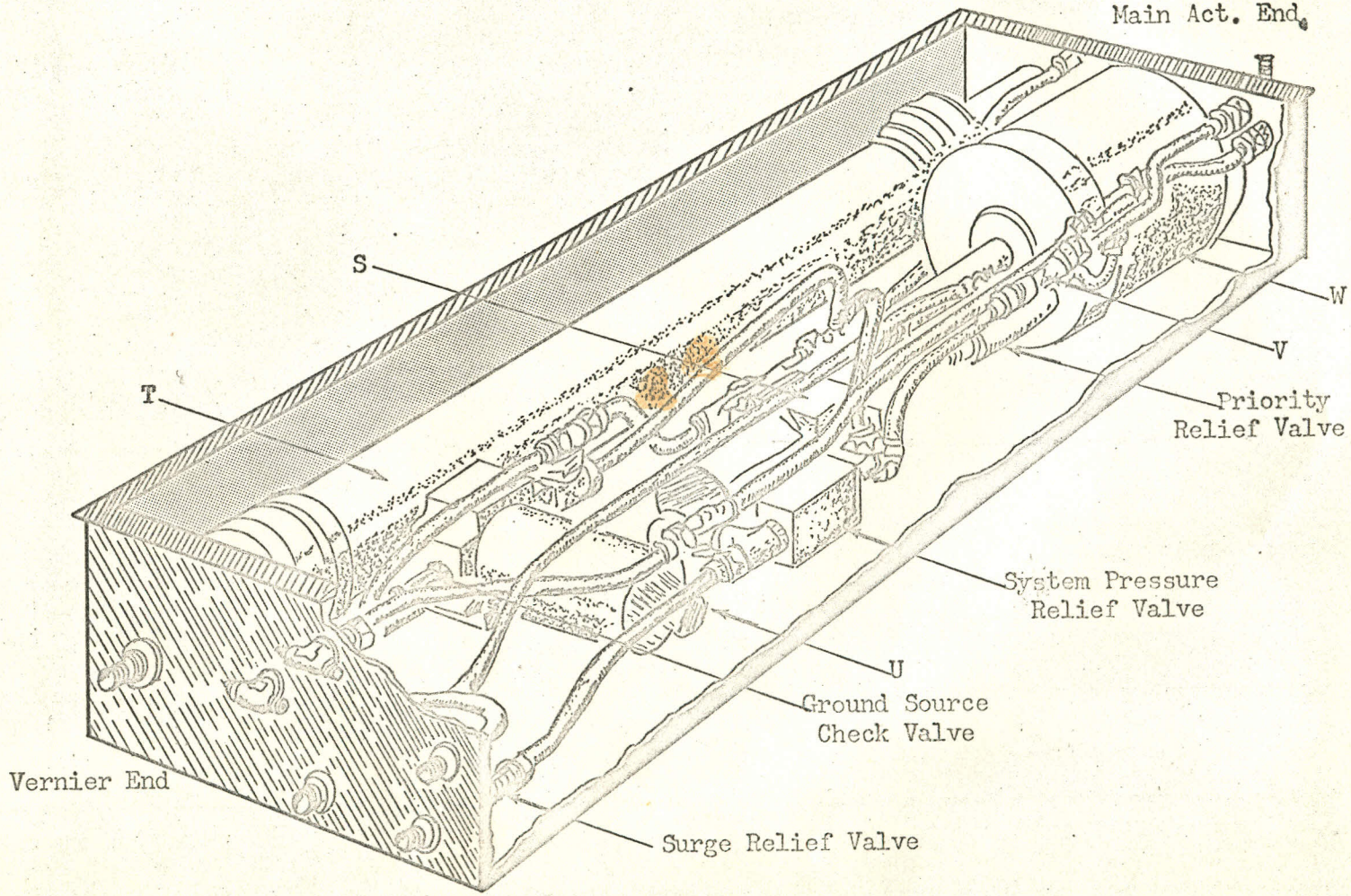

Figure 3 HYDRAULIC POWER PACK INSTALLATION