


MILWAUKEE SICARD  
SANIVAN PARTS BK

# SICARD

  
**IMPORTANT**

WHEN ORDERING PARTS  
ALWAYS SPECIFY:

1° TRUCK (T) SERIAL NUMBER

2° ENGINE SERIAL NUMBER/s

STATE ALSO  
SHIPPING INSTRUCTIONS

**Snowmaster**

**Junior Snowmaster**

**Truck**

**Sanivan**   
(GARBAGE COLLECTOR)

**Street Flusher**

**SPARE PARTS  
— AND —  
INSTRUCTION**

# MANUAL

**SICARD INDUSTRIES INC.**

PLANT and OFFICE

753 W. MAIN ST., WATERTOWN, N.Y.

Tel. Watertown 587

BRANCH OFFICES:

Suite 5029,  
30 Rockefeller Plaza,  
New York City

Suite 1038,  
228 North La Salle St.,  
Chicago, Ill.

300  
H201

## PARTS

WHEN ORDERING PARTS ALWAYS GIVE THE FOLLOWINGS INFORMATIONS:

- 1- The Model and Number of the machine on which parts applies.
- 2- The Number and Name of the parts ordered. Use no abbreviations.
- 3- Do not use the word "complete". Be specific and state exactly what is wanted.
- 4- Group parts required under group headings.
- 5- Always confirm the emergency requisitions sent by telephone or telegraph.
- 6- State date delivery is required.
- 7- Give definitive shipping instructions, otherwise our Traffic Department will use their best judgment in routing shipments.

## PARTS RETURNED FOR CREDIT

ALL CLAIMS MUST BE MADE WITHIN THREE DAYS AFTER RECEIPT OF GOODS.

GIVE YOUR INVOICE NUMBER AGAINST WHICH CREDIT IS TO BE APPLIED.

TRANSPORTATION CHARGE MUST BE PREPAID.

NEVER RETURN A PART TO OUR FACTORY WITHOUT IDENTIFYING SAME IN THE FOLLOWING MANNER:-

- a) Write us a letter informing what you are returning and why.
- b) Place tag on the outside of the box or package showing your name and address.
- c) Tag each article in the box or package stating what, how many and why return.
- d) Don't fail to specify engine number from which part was removed.



## SERVICE WARRANTIES AND POLICIES

Sicard Limited has adopted the following as its Service Warranties and Policies:

### 1. STANDARD SERVICE WARRANTIES:

- (a) Subject to the provisions of paragraphs "b" to "f" inclusive Sicard Limited guarantees its products against defective materials or workmanship as follows:

<u>TYPE OF APPLICATION</u>	<u>WARRANTY PERIOD</u>
TRUCKS	Ninety (90) days after delivery to the original purchaser or not to exceed three thousand (3000) miles of service whichever event shall first occur.
SNOW-BLOWERS	Ninety (90) days after delivery to the original purchaser between November 15 and March 15, of following year. Ex: If a unit is delivered on February 1, its warranty period will extend until January 1 of the following year providing all precautions as set forth by Sicard Limited have been taken during the idle period to protect the unit against corrosion or any other damage caused by a lack of maintenance.
CARBAGE COLLECTORS (Sanivan)	Ninety (90) days after delivery to the original purchaser.
STREET FLUSHERS	Ninety (90) days after delivery to the original purchaser.

Provided, however, that the guarantee of Sicard Limited on materials or equipment which are purchased from an outside source shall be limited to the guarantee of the outside manufacturer to Sicard Limited.

- b) Parts returned, which are found by Sicard Limited to be defective in material or workmanship, shall, at the option of Sicard Limited, either be repaired, replaced or credited, and it is agreed that the liability of Sicard Limited is expressly limited to such repairing, replacement or credit. Parts shall be returned, transportation charges prepaid, at Purchaser's risk and with previous permission of Sicard Limited. No claims will be allowed which in the opinion of Sicard Limited result from units or parts having been subjected to abuse or neglect or where failure has been caused by accident.
- c) Sicard Limited shall not be liable for any expense incurred for materials furnished or work done by or for the Purchaser, or its customers or users of products of Sicard Limited in connection with or due to any alleged defects, unless previously authorized by Sicard Limited, in writing. The present guarantee must not be construed as involving any liability on the part of Sicard Limited for any personal injury or property damaged of any nature resulting from alleged defective parts or workmanship.
- d) Sicard Limited assumes no responsibility for contingent liability through the failure of any product or part thereof.
- e) If Sicard Limited renders service on an allegedly defective product of its manufacture and the said product is found not to be faulty the time and expense chargeable to such service shall be charged to and paid by the person or organization who requested such work to be done.
- f) The following information must be submitted with all requests for adjustments covering field service and alleged defects:
- |                                 |   |
|---------------------------------|---|
| 1. Owners name and address.     | 5. Information as to the nature of the trouble                          |
| 2. Description and model number | 6. Date actually placed in service                                      |
| 3. Serial number (if any)       | 7. Accumulated days or miles of service.                                |
| 4. Type of service.             | 8. Make and model of associated equipment if used with other machinery. |

### 2. FIELD SERVICE:

Field service facilities are maintained by a) distributors and by b) Sicard Limited. All requests for field service must be handled through the distributor who sold the equipment and any requests received direct from users will be referred to the appropriate party.

### 3. GENERAL

- a) Sicard Limited reserves the right to improve its products through changes in design or materials without being obligated to incorporate such changes in products of prior manufacture.
- b) No distributor is authorized to transact any business in the name of nor to incur any liabilities or obligations on behalf of Sicard Limited unless specifically so authorized in writing by an official of Sicard Limited.

# S I C A R D   S A N I V A N

## DESCRIPTION AND OPERATING INSTRUCTIONS

### I - DESCRIPTION

The Sicard "SANIVAN" is an enclosed body of the sanitary garbage collector type, which is provided with an hydraulically operated loading and unloading mechanism and can be mounted on almost any 3-4 ton truck chassis of the corresponding length (105-110" from cab to rear axle).

The Sanivan consists of the following main parts:

#### 1. BODY

The body is rectangular about 70" high by 84" wide, has an average length of 116" and a volume of 14.6 cubic yards. It is made of sheet steel electrically welded and each side wall has two reinforcing members.

#### 2. REAR PANEL

The body is closed at its rear by a detachable wall or panel. It is attached at its top to the body by means of horizontal hinges and can be swung or operated around those hinges and thus opens the body for unloading. It is operated by two hydraulic cylinders, called "carrier cylinders". At the bottom it is locked by two hook latches, operated by a shaft and hand lever located on the right hand body side at rear.

In addition, the rear panel carries all parts of the hydraulically operated loading mechanism, consisting of a bucket, compressor plate and retainer plate, as well as of two pairs of hydraulic cylinders.

#### 3. BUCKET

The bucket (or hopper) is actually the part in which the refuse is loaded. It projects conveniently at the rear of the van, and is 56" wide. Its edge is approximately 37" from the ground (varying with chassis height and tire size) and loaders can conveniently empty all garbage cans, boxes into bucket without undue efforts.

#### 4. COMPRESSOR PLATE

The compressor plate (or compressor door) swivels around a transverse axis or shaft (parallel to chassis axles) and is driven by a pair of hydraulically operated cylinders. It closes the bucket after it is filled and moves all loaded garbage forward. The compressor plate is of sturdy rigid design. The pressure developed by the compressor plate amounts to approximately 13,000 lbs. (measured at its center with oil pressure at 755 lbs/sq.in.). This powerful compressor plate breaks all boxes, drums, cans, bottles and similar bulky things, compresses and compacts all paper, kitchen and grocery refuse and similar soft material, thus bringing the full bucket load to about 1/4 or even less of its original volume.

After the compression against the retainer plate has been completed, the retainer plate is lifted and thus opens the entrance into the van body. The compressor plate then continues its stroke forward and pushes the compressed garbage inside the body. While the compressor plate is in this position, the retainer plate is moved down to close the body entrance, then the compressor plate returns to its initial position and opens the empty bucket for loading again.

#### 5. RETAINER PLATE

The retainer plate also swivels around a transverse shaft and is driven by another pair of hydraulically operated cylinders. It serves to keep the van body closed, and prevents the garbage from falling back into the bucket and the unpleasant dust and odor from spreading around the truck.

The retainer plate is of sturdy design as it also serves as a rigid back plate (reaction plate) against which the compressor plate exerts its compressing and crushing action. Seen from the loaders' position behind the truck, the retainer plate moves up and down, closing the body entrance at its lowest position and opening it at its highest.

#### 6. BULKHEAD

The bulkhead is a "false wall" inside the body which is used for unloading (dumping) when the rear panel is opened. It is operated by the same pair of "carrier cylinders" as the rear panel and pushes the whole load to the van's rear and out of the body. There is about 2 feet forward or backward movement of the hinged bulkhead, before the rear panel begins to open or after it has closed.

#### 7. HYDRAULIC SYSTEM

The hydraulic system of the Sicard SANIVAN comprises the following main parts:

##### a) Hydraulic pump

The hydraulic pump is of the centrifugal type. It is operated by a power-take-off connected to the truck's transmission. A ratio of about 60-80% of the engine r.p.m. is recommended. The pump delivers 28 gallons per minute and should not operate faster than 1000 r.p.m. The pump supplies all the pressure required by the hydraulic system. The clutching in or out of the power-take-off is done by a lever in the floor of the cab.

##### b) Relief valve

A relief valve, located near the pump on its pressure side, regulates the oil pressure required by the hydraulic system. It provides relief and prevents the oil pressure from raising over the set maximum. For adjustment purposes it is provided with an adjusting screw and lock nut. This screw and nut is located beneath a large protecting cap. The recommended maximum oil pressure in the hydraulic system is 750-800 lbs. per sq. in. (This valve is sealed and should not be readjusted unless done by an authorized mechanic with proper calibrating instruments).

c) Hydraulic cylinders

The hydraulic system of the Sicard SANIVAN, comprises three pairs of cylinders, as mentioned above. The whole driving mechanism is located in special compartments, one on either side of rear panel. These compartments are provided with large doors for inspection and maintenance. The longer cylinders, one on each side, operate the compressor plate, and the shorter ones (also one on each side) operate the retainer plate.

The third pair of cylinders, the so-called "Carrier cylinders" operate (or open) the rear panel and move the unloading bulkhead. They are located inside the main body at the front and are connected diagonally in order to save space and still get the required stroke.

d) Operating valves

There is one operating valve for each pair or set of hydraulic cylinders. The operating valve of the cylinders driving the compressor plate is located in the upper corner of the right hand cylinder compartment.

The valve of the retainer plate cylinders - at the upper corner of the left cylinder compartment. The valve of the carrier cylinders (rear panel and bulkhead) is in the front of the Sanivan body, just behind the driver's cab.

e) Control levers

The compressor and retainer plates are controlled by two levers located closely together on the right hand side of the rear panel; the right hand one controls the compressor plate and the left hand one the retainer plate. The carrier (unloading) cylinders are controlled by a lever located midway on the right hand side of the body.

f) Buzzer signal

Finally there is a buzzer signal just above the two control levers on the rear panel. It serves for a system of signals from loaders to driver. There are two main signals, which usually are transmitted:

1. Clutching in or out of hydraulic pump drive.
2. Proceeding forward with the truck, as soon as all garbage at one stop has been picked up and loaded. The driver and the loaders should agree upon the signals to be used.

## II - OPERATING INSTRUCTIONS

1. The operation of the Sicard SANIVAN is extremely simple. A half-a-day's work will be sufficient for the operators to get well acquainted with it.
2. **IMPORTANT:** The driver should engage the clutch of the hydraulic pump drive only when the truck has stopped and when he received the required signal. As soon as loading is finished, the driver should disengage the

- pump clutch. He should never leave the pump clutch engaged when the truck is travelling, this in order to avoid unnecessary wear and any possibility of accidents. The loaders are usually travelling on the rear steps and it may happen that one of them would grasp the operating lever instead of the iron-bar handles provided for the use of the loaders while travelling on the steps.
3. With truck engine running, engage the oil pump clutch. Run the engine at about 1400 r.p.m. and the loading mechanism is ready for operation.
  4. Sequence of the loading operations (at the start - compressor and retainer plates in their "Closed positions):

Operation to perform	Performing part & its motion	Control Lever	
		Left	Right
To open the bucket	Compr. Plate up	-	Push up
To fill the bucket	-	-	-
To compress the bucket load	Compr. Plate down	-	Pull down
To open the entrance into the body	Retainer plate up	Push up	-
To push the load inside	Compr. Plate down (pushing forward)	-	Pull down
To close the body entrance	Retainer plate down	Pull down	-
To open the bucket	Compr. Plate up	-	Push up

.... then this cycle is repeated again.

Each above indicated operation is finished when the corresponding part (compressor or retainer plate) does not move any more.

5. After each operation, remove hand from the control lever and it will return automatically, through the valve spring action, to its middle, neutral position.
6. The hydraulic system, if in good operating condition, cannot do any harm to any part of the unit, as there is a by-pass connection and a relief valve, which takes care of any excess of oil flow or pressure.
7. The Sanivan is fully loaded only when the compressor plate cannot push any additional material from the bucket into the body.
8. All compressible material such as boxes, drums, cans, paper, kitchen and grocery refuse and so on should be crushed and compressed before lifting the retainer plate and pushing the load inside the body, in order to reduce its volume as much as possible.
9. It is naturally useless to attempt to compress non-compressible material, such as ashes, sand or earth. However, it should be pushed by the compressor plate as far as possible forward before lifting the

retainer plate. This will prevent the garbage from falling out of the body back into the bucket.

10. The unloading of the van consists of opening the rear panel and of pushing the load out by the moving bulkhead (false wall). These two actions are performed by one pair of hydraulic carrier cylinders. As mentioned in the description, the corresponding control lever is located on the right hand body side.
11. Before opening the rear panel for unloading, release the locking latch at the panel bottom by pulling up the lever located on the right hand side, near the bucket bottom.
12. To open the rear panel and unload the van, pull the lever at the right hand side of the body. The bulkhead inside the body will start to move towards the van's rear and after a while the unlocked rear panel will begin to raise. Hold the lever until the panel is fully opened and the bulkhead has reached its final position.
13. To close the van, push the same lever in. Hold the lever until not only the rear panel is closed, but until the retarding bulkhead has reached its original position. Don't forget to relock the latch at the bottom of the rear panel by pushing the hand lever down.
14. While new, all moving parts will be tight and stiff and, of course, as the Sanivan is "run in", the performance will improve.

### III - MAINTENANCE INSTRUCTIONS

The maintenance of the Sicard "SANIVAN" is practically the same as almost all similar mechanical units and consists mainly of regular inspections, cleaning and lubricating.

#### 1. INSPECTIONS

Regular inspections are indispensable in order to discover and remove eventual minor faults in time. Such faults, if not noticed, may cause greater damage and costly repairs. Particularly it should be checked whether all moving parts are well lubricated and all hydraulic line connections are tight.

#### 2. CLEANING

It is obvious that a regular and thorough washing and cleaning of the Sanivan is especially important, because garbage is naturally a dirty load. It may contain most unexpected chemicals and garbage residues may develop various harmful acids, which will cause damage (rust, corrosion, etc.).

Besides, these regular cleanings offer the best opportunity for at least partial inspections.

#### 3. LUBRICATION

Grease (through Zerk Fittings) and oil all moving parts at least after every 24 hours of work.



Use Marathon Hydraulic Oil E.L. or Polar #41 in the hydraulic system. To check the oil level in reservoir, bring all pistons to "closed" position. Oil level should be between the MIN (minimum) and the MAX (maximum) marks shown on gauge.

When the Sanivan is not in use, be sure that all pistons rods are pulled into the cylinders so that they will not get dry and rusty.

4. CHECKING OIL PRESSURE

The maximum oil pressure in the hydraulic system should be checked regularly, "at least once a month". This is necessary to make sure that the relief valve functions correctly and that the whole hydraulic system and mechanical parts are not subjected to undue pressure and strain. The maximum operating pressure in the Sanivan hydraulic system should be between 750 and 800 lbs/sq. in. To check that pressure use a reliable oil pressure gauge with a dial reading up to 2000 lbs/sq. in.

Connect this gauge to the end of the copper pipe provided for that purpose and located in the upper part of the right hand cylinder compartment. This 3 feet long copper pipe is bent into a spiral and its end is provided with a pipe cap plug. Remove this plug, connect the pressure gauge, start the truck engine, engage the pump drive clutch, accelerate the engine and check the oil pressure.

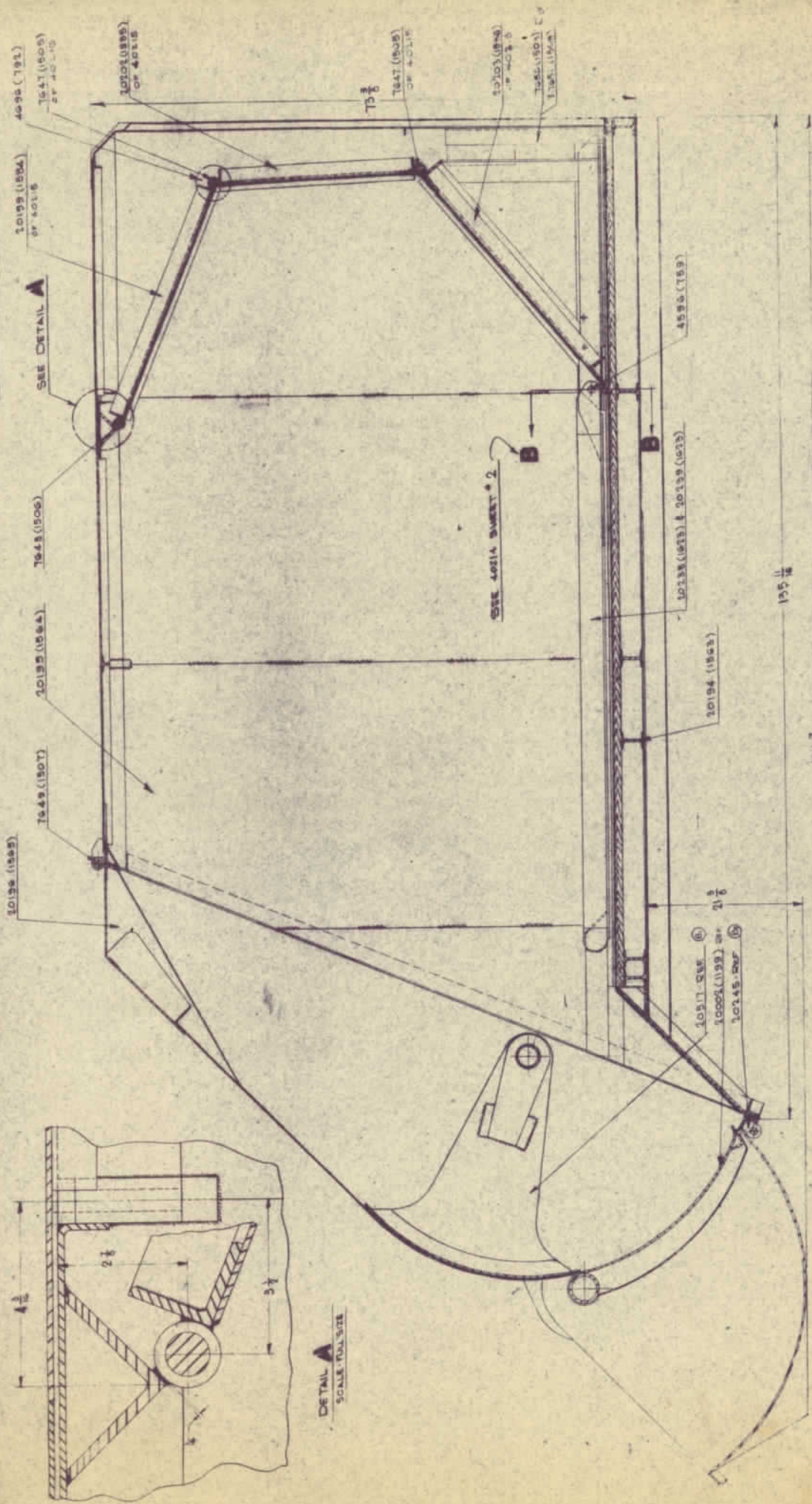
5. For maintenance of the truck chassis, follow the manufacturer's instructions.
6. Inspect once a month bolts holding van to chassis and tighten if necessary.

Montreal, June 28th 1949.

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40103 - HYDRAULIC SYSTEM, SEE ASSY DWG  
 10310 - SIDE TOOL BRK ASSY (M. SEE 40114 DWG)  
 10313 - L.V.  
 10314 - FINDER ASSY SEE 40114 SHEET # 2

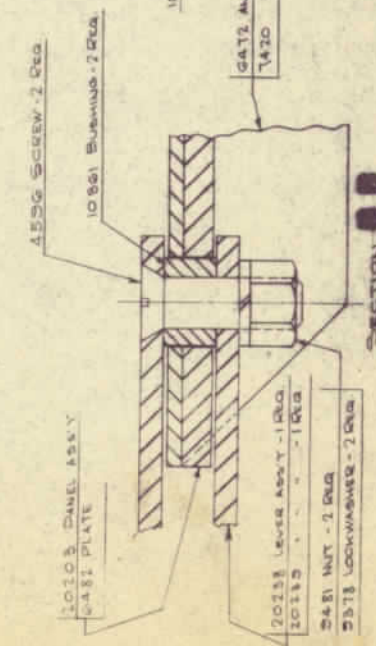
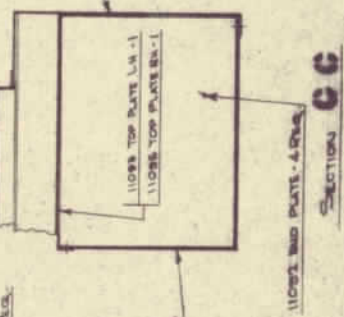
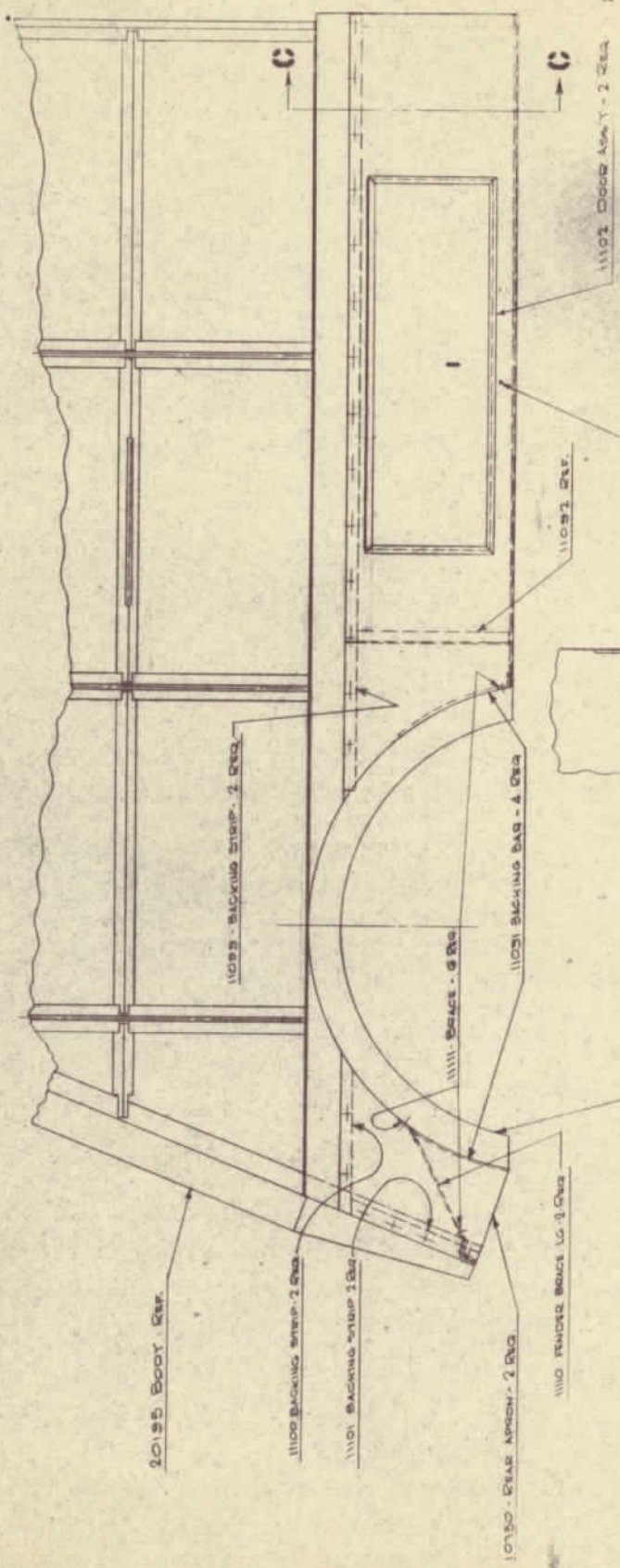
NOTES



DETAIL A  
 SCALE 10:1

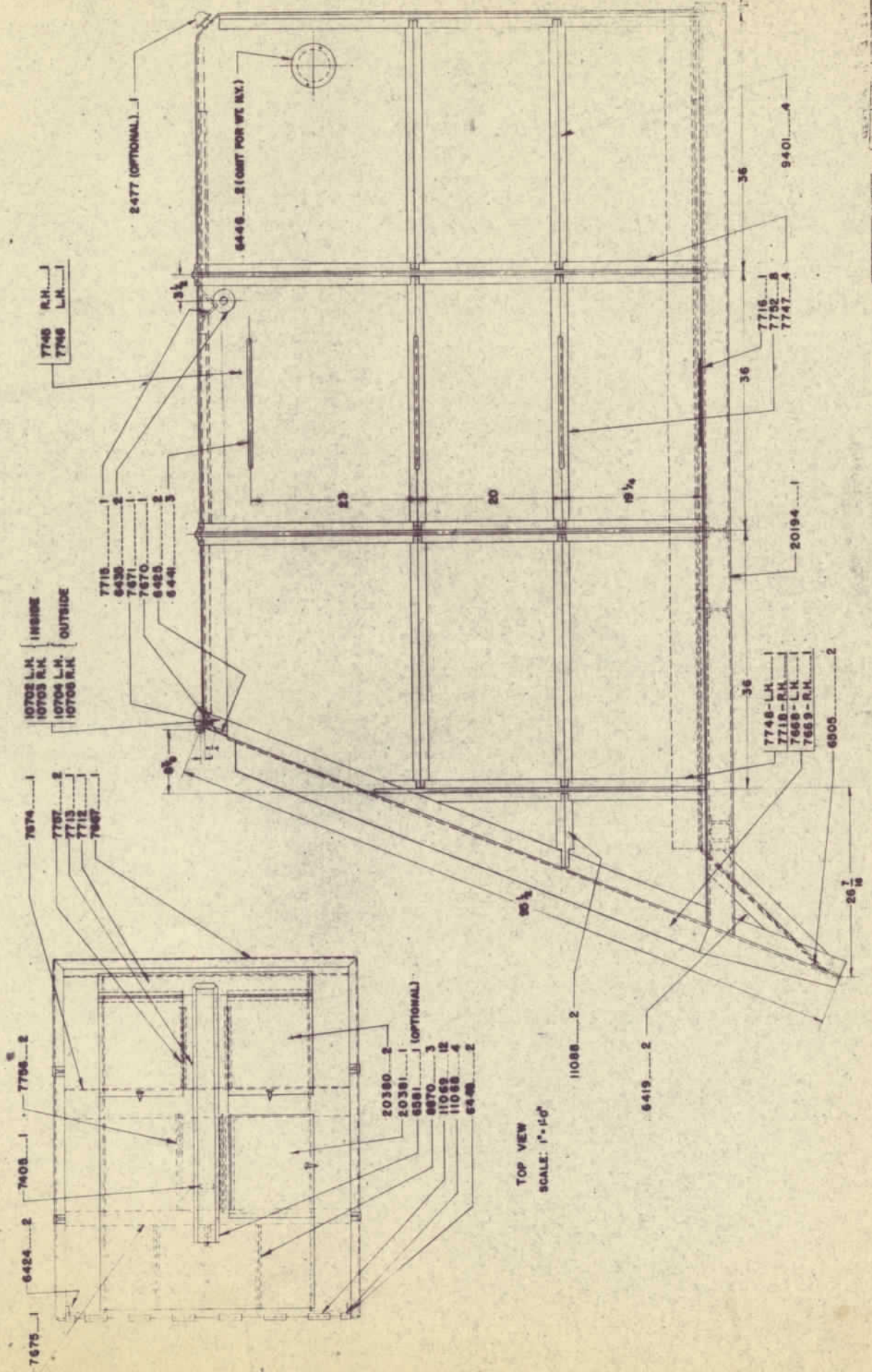
REV.	DATE	BY	CHKD.	DESCRIPTION
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

VIEW SHOWING ASSY - 20385 LH # 10386 RH TOOL BOX



NO.	REV.	DATE	BY	CHKD.	APP.

SHEET # 1 OF 2 SHEETS	
DATE	
SCALE	
DESIGNED BY	
CHECKED BY	
APPROVED BY	
NO.	40214



NO.	REV.	DATE	BY	CHKD.	APP.
1					
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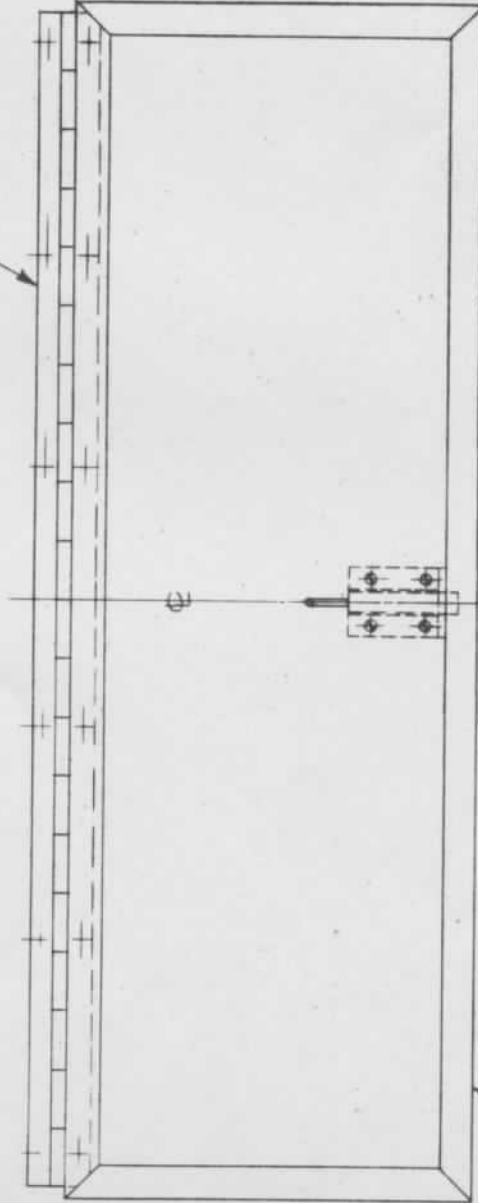
11104 HINGE - 1 REQ.

DRILL 11105 DOOR - 6 HOLES.  $\frac{1}{32}$  DIA

SPOT FROM HINGE AND SECURE WITH:

8529 x  $\frac{1}{2}$  STOVE BOLT & NUT 6 REQ.

9368 LOCKWASHER 6 REQ.



11106 - 1 REQ.

11103 - 1 REQ.

2484 - STRIKER. 1 REQ.

8529 x  $\frac{3}{4}$  STOVE BOLT & NUT - 4

9368 LOCKWASHER - 4

NEXT ASS'Y. 20385 - 20386

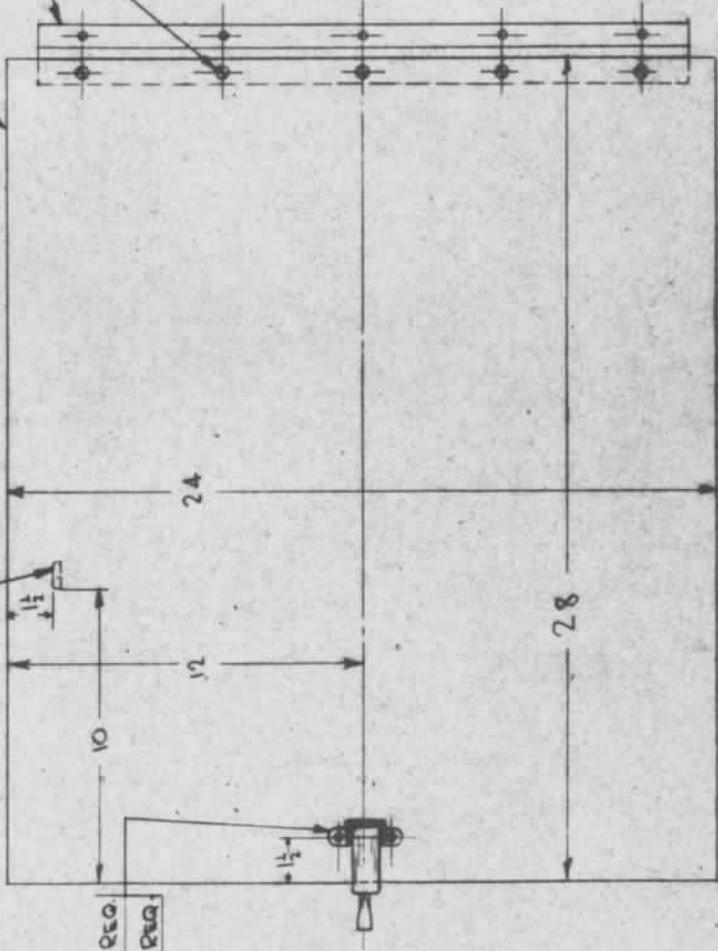
Material	Drawn	Checked	Eng. App.	Qty	Date
Expressions				2	4-3-45
	SICARD LTD.				
	3088 BENNETT AVE MONTREAL				
	SAUVAN SIDE TOOL BOX				3: - 1'-0"
	DOOR ASS'Y				Part No 11102

T744 - STAPLE - 2 REQ.  
 WELD TO 8162 & T157  
 ON 20195 ASS'Y ONLY AND  
 INSTALL T143 CHAIN -

8162 DOOR - 1 REQ.

7400 HINGE - 1 REQ.

8329  $\times \frac{3}{4}$  STOVE BOLT & NUT - 5 REQ.  
 9368 LOCKWASHER - 5 REQ.



3292 FASTENER - 1 REQ.  
 8453  $\times \frac{1}{4}$  RIVET - 2 REQ.

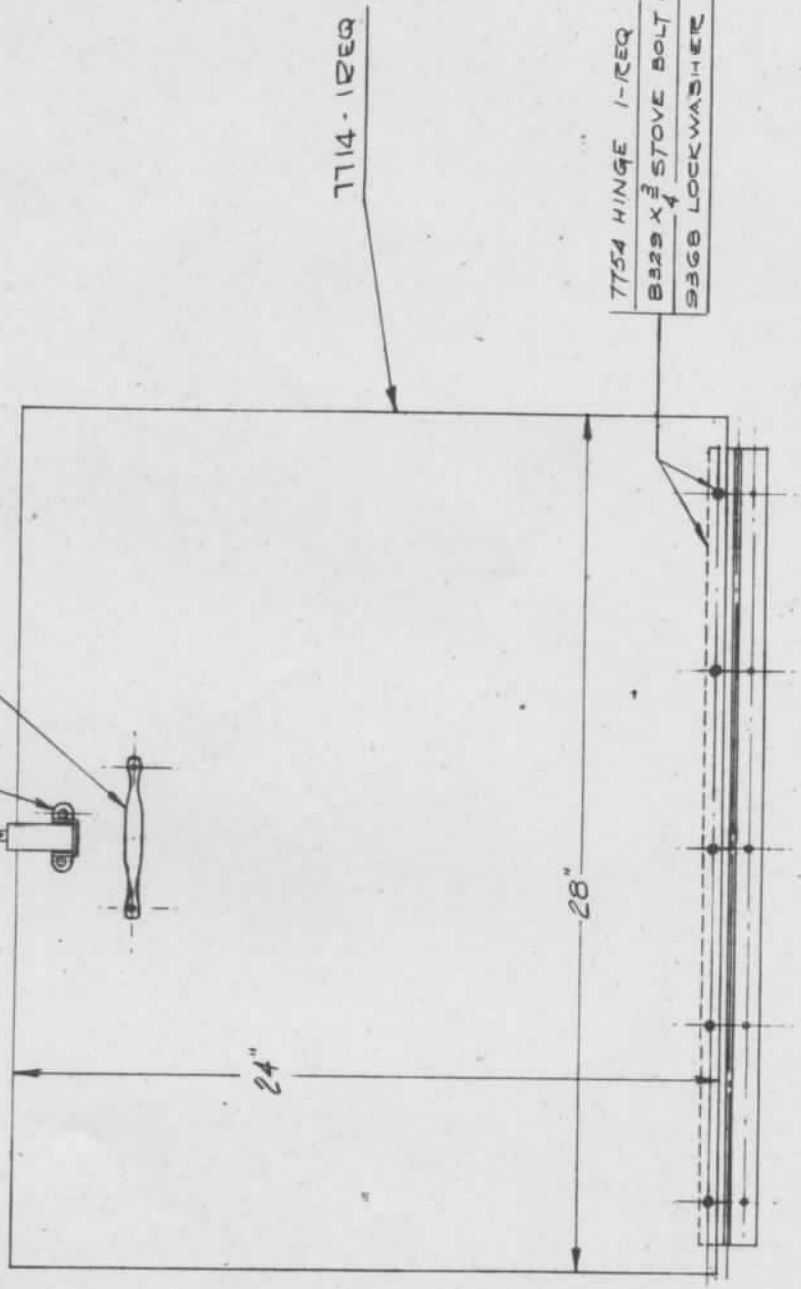
NEXT ASS'Y - 20195

Part No.	Qty	Part Name	Unit	Part No.	Qty
8162	1	DOOR	1	4-13-49	2
BICARD LTD.					
808 BENNETT AVE. MONTREAL					
SAU BODY TOP					
FRONT DOOR ASS'Y					
					20380

20381

5232 FASTENER 1-REQ  
8453 X 1/4" RIVET 2-REQ

4414 HANDLE 1-REQ  
8453 X 1/4" RIVET 2-REQ



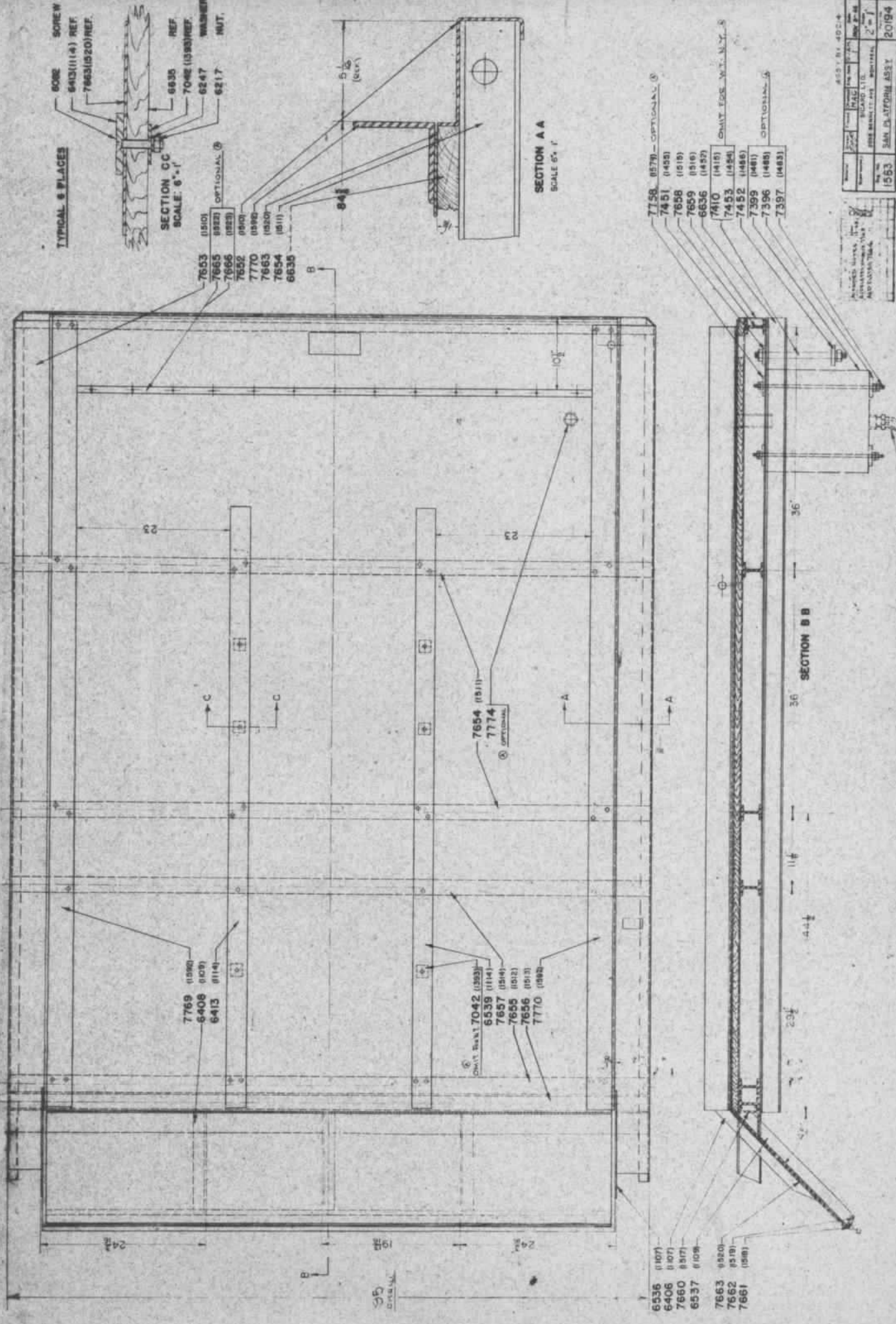
7714 - 12EQ

7754 HINGE 1-REQ  
B329 X 3/4" STOVE BOLT 1-REQ  
9368 LOCKWASHER 5-REQ

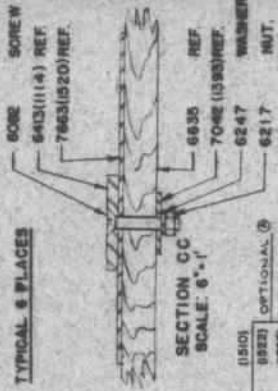
NEXT ASSY 20381

DATE	BY	CHKD	APP'D	DATE
PLUN				APRIL 15/48
SUPERVISOR		SICARD LTD.		
8085 BENNETT AVE		MONTREAL		
SANIVAN BODY		PART NO		
TOP CENTER DOOR ASSY		20381		





TYPICAL S PLACES



BORE SCREW  
6413(114) REF  
7663(1520) REF

6635 REF  
7042 (1593) REF  
6247 WASHER  
6217 NUT

- 7663 (1510)
  - 7665 (1522)
  - 7666 (1523)
  - 7652 (1510)
  - 7770 (1592)
  - 7663 (1520)
  - 7654 (1511)
  - 6635
- OPTIONAL ⑥

SECTION A A  
SCALE 6" = 1"

- 7758 (1578) - OPTIONAL ⑤
  - 7451 (1453)
  - 7658 (1519)
  - 7659 (1516)
  - 6636 (1457)
  - 7410 (1415)
  - 7453 (1454)
  - 7452 (1485)
  - 7399 (1481)
  - 7396 (1488)
  - 7397 (1483)
- OPTIONAL ⑤

SECTION B B  
SCALE 6" = 1"

REV	DATE	BY	CHKD	APP'D
1				
PROJECT: SAN JUAN VICTORIE 1531 DRAWING NO: 20194 SHEET NO: 1563				

5551 R1 402-4  
 1563  
 SAN JUAN VICTORIE 1531  
 20194

OPTIONAL - 7775

- 6536 (1107)
- 6406 (1071)
- 7660 (1571)
- 6537 (1109)
- 7663 (1520)
- 7662 (1519)
- 7661 (1508)

- 7769 (1590)
- 6408 (1079)
- 6413 (1141)

- OPTIONAL ⑥
- DRY TREAT 7042 (1523)
- 6539 (1141)
- 7657 (1514)
- 7665 (1521)
- 7656 (1513)
- 7770 (1582)

- 7694 (1511)
- 7774 (OPTIONAL)

19  
 24  
 19  
 24  
 19  
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 19  
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 36  
 11 1/2  
 4 1/2  
 29 1/2  
 10 1/2

B

A

A

C

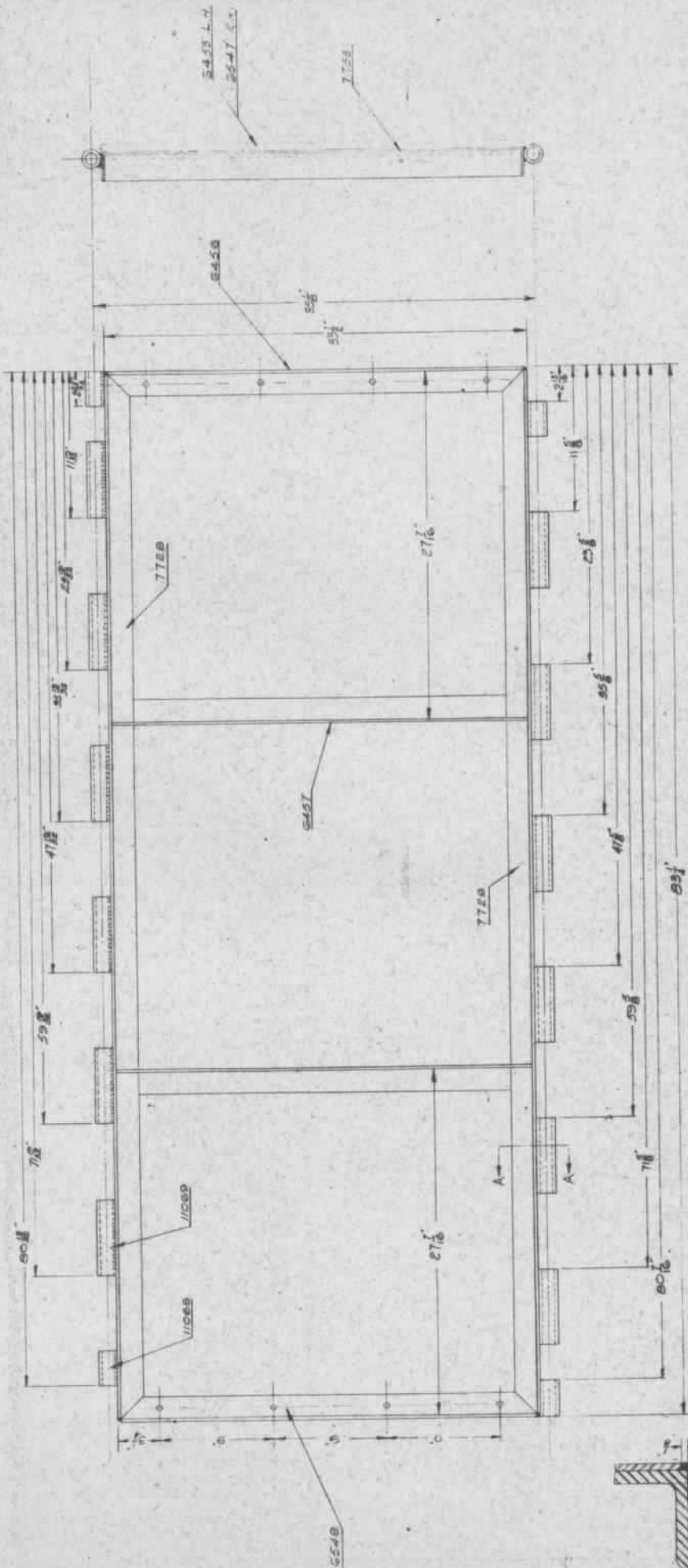
C

B

5 1/2 (DRY)

84

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 55



PLAN - 1st FLOOR

NO.	DATE	BY	CHKD.	APP.
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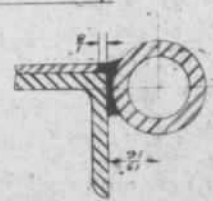
1st FLOOR

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1st FLOOR

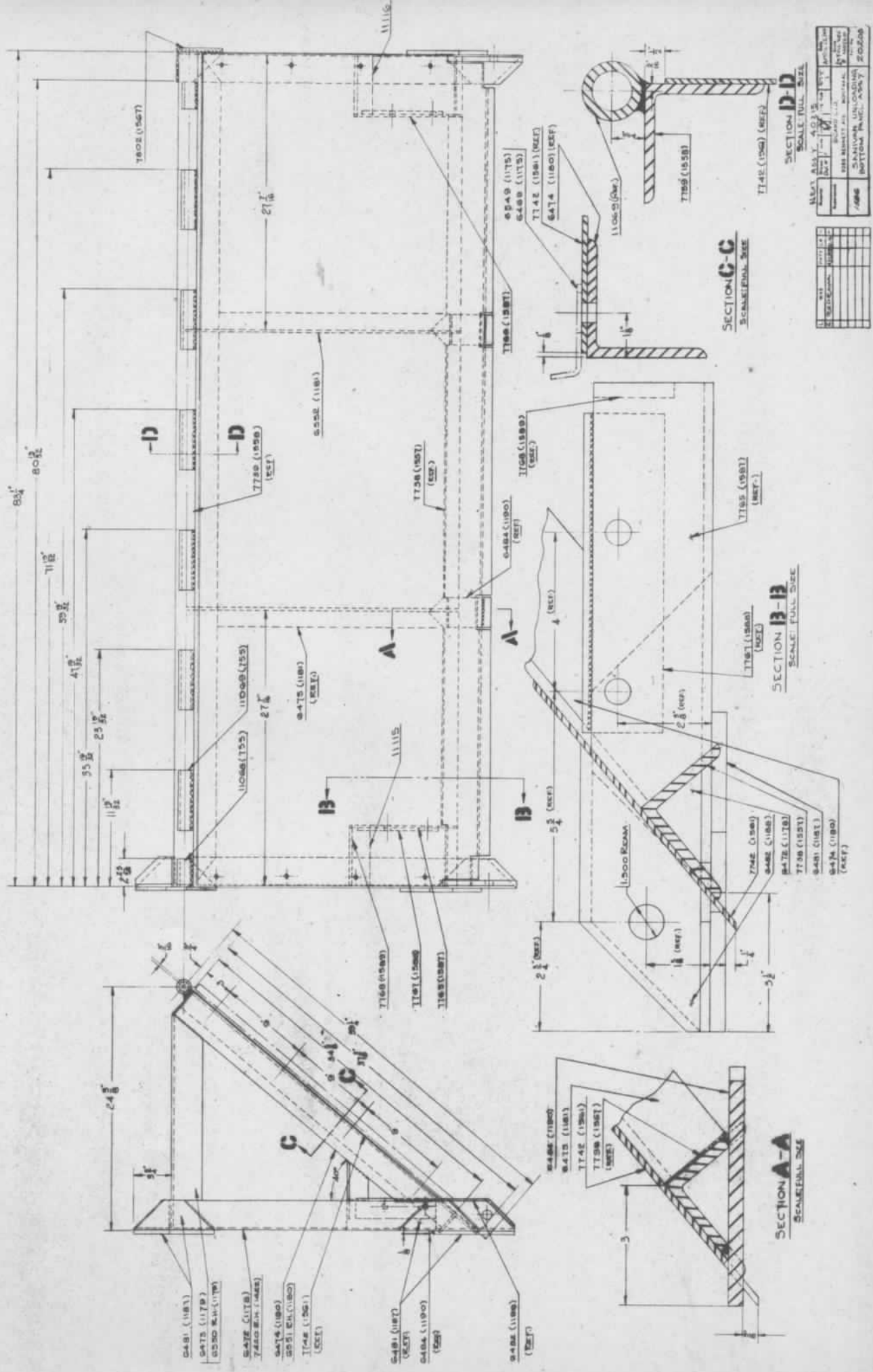
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1	1/27			

NO.	DATE	BY	CHKD.	APP.
1	1/27			



SECTION A-A  
FULL SCALE





**SECTION A-A**  
SCALE: FULL SIZE

**SECTION B-B**  
SCALE: FULL SIZE

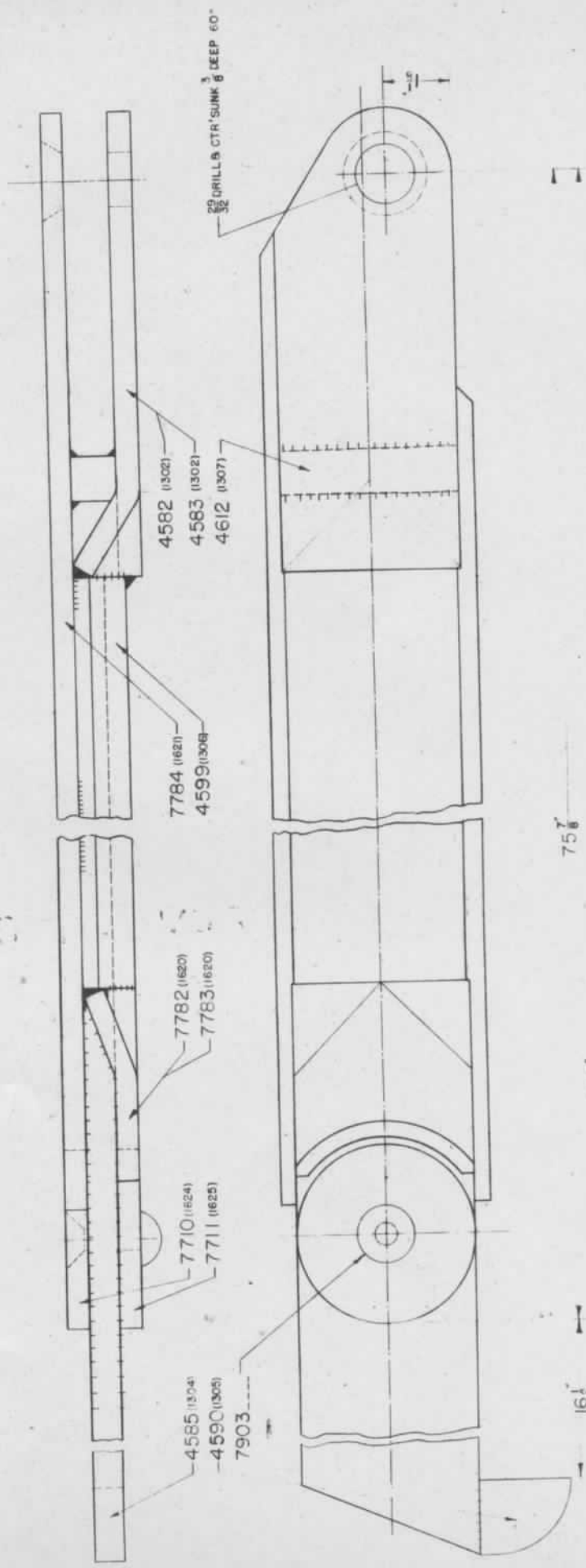
**SECTION C-C**  
SCALE: FULL SIZE

**SECTION D-D**  
SCALE: FULL SIZE

REV. ASSY. A-03-15

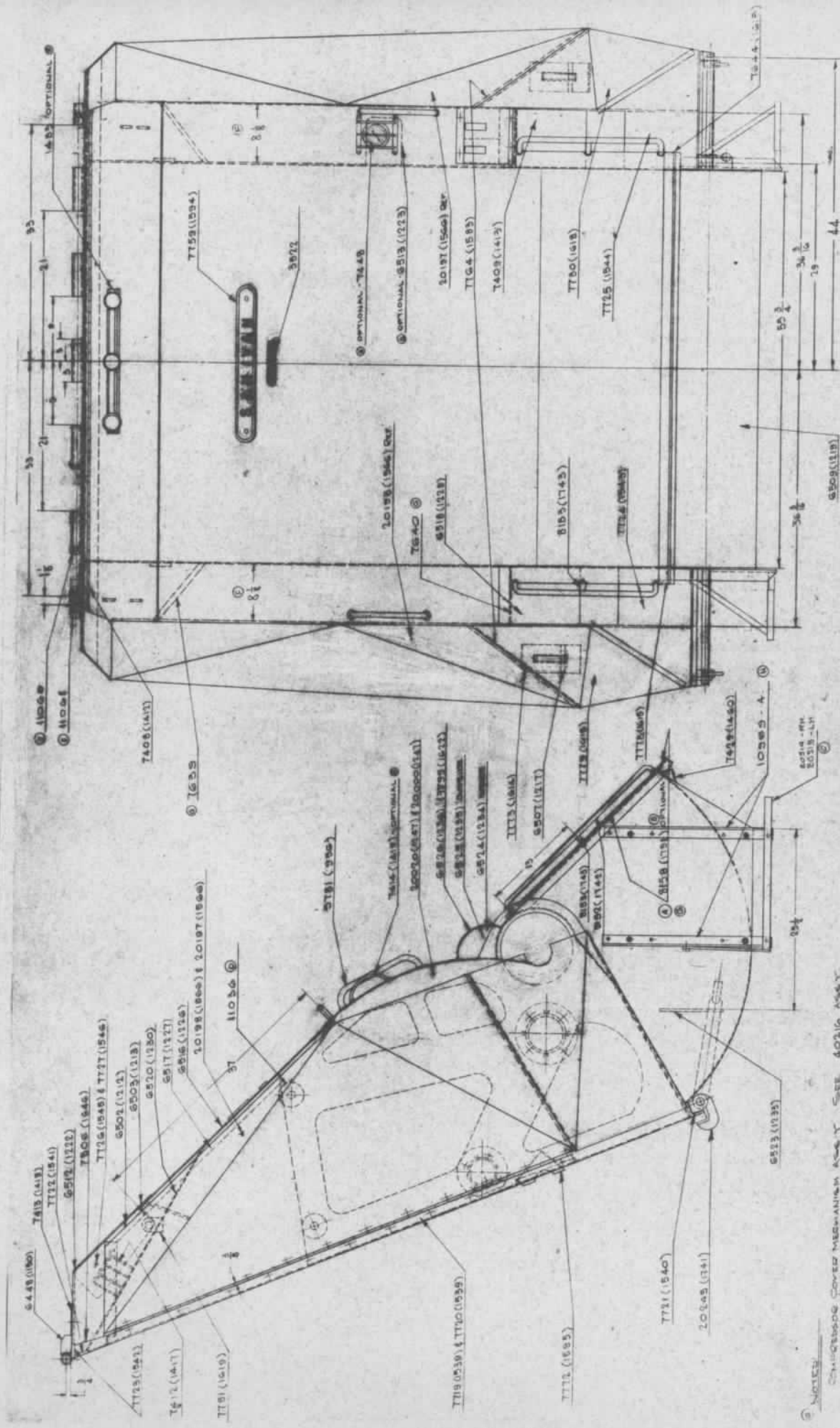
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3					ISSUED FOR CONSTRUCTION
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5					ISSUED FOR CONSTRUCTION
6					ISSUED FOR CONSTRUCTION
7					ISSUED FOR CONSTRUCTION
8					ISSUED FOR CONSTRUCTION
9					ISSUED FOR CONSTRUCTION
10					ISSUED FOR CONSTRUCTION

DATE REVISION: 11/15/15  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]  
 PROJECT NO.: 20208



SANIVAN LEVER ASS'Y L.H. #20238 SHOWN  
 SANIVAN LEVER ASS'Y R.H. #20239 OPPOSITE

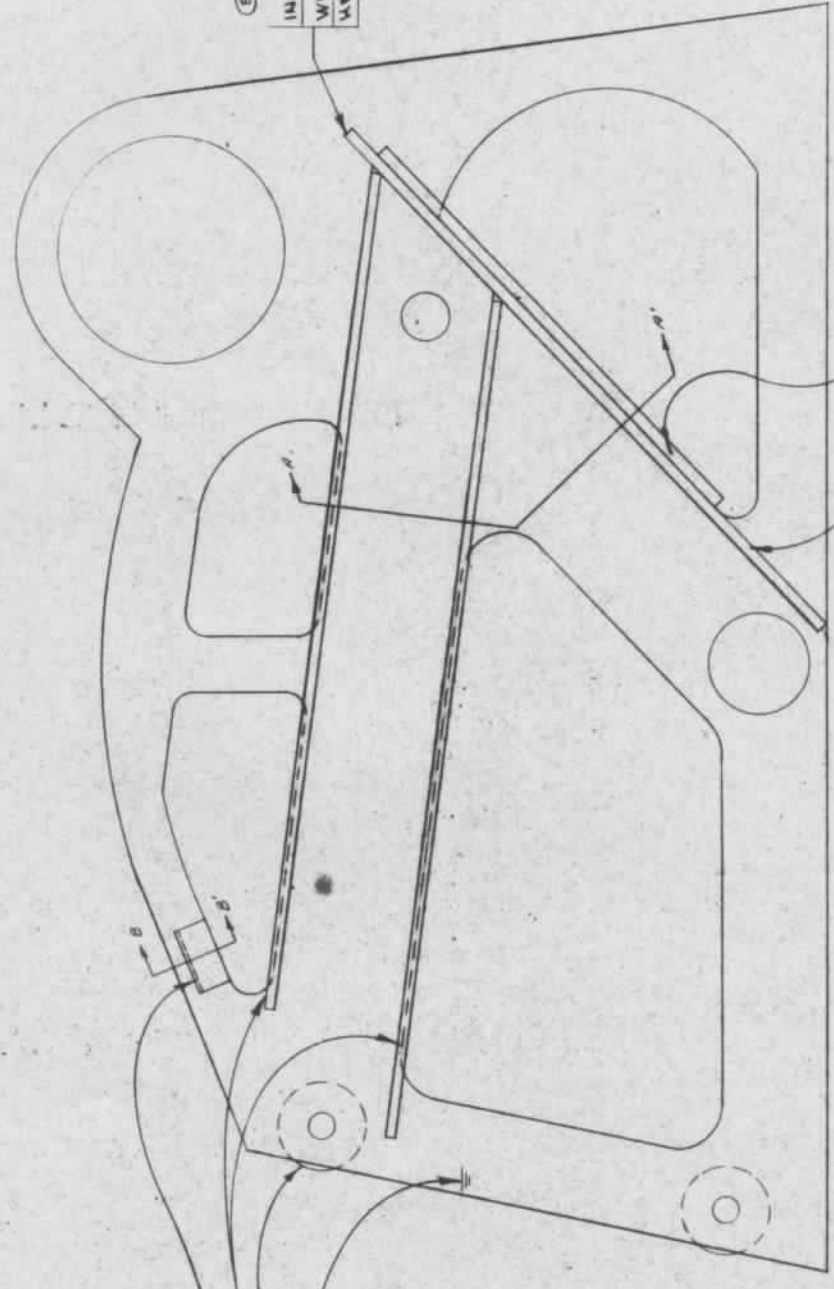
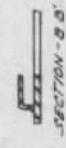
M.S.	1008 BENTLEY AVE. MONTECAL	DATE	REV.
1/623	SANIVAN LEVER ASS'Y	10/27/58	1
1623	80239	10/27/58	1



CHUCKER COVER MECHANISM ASSY SEE 40216 ASSY  
 RETAINER BLADE MECHANISM ASSY SEE 40218 ASSY  
 GRAB JUICE TANK ASSY SEE 7423 ASSY

REV	DATE	BY	CHK	APP	DESCRIPTION
1	10/1/55	J. W. BROWN	J. W. BROWN	J. W. BROWN	ISSUED FOR FAB
2	10/1/55	J. W. BROWN	J. W. BROWN	J. W. BROWN	ISSUED FOR FAB
3	10/1/55	J. W. BROWN	J. W. BROWN	J. W. BROWN	ISSUED FOR FAB
4	10/1/55	J. W. BROWN	J. W. BROWN	J. W. BROWN	ISSUED FOR FAB
5	10/1/55	J. W. BROWN	J. W. BROWN	J. W. BROWN	ISSUED FOR FAB
6	10/1/55	J. W. BROWN	J. W. BROWN	J. W. BROWN	ISSUED FOR FAB
7	10/1/55	J. W. BROWN	J. W. BROWN	J. W. BROWN	ISSUED FOR FAB
8	10/1/55	J. W. BROWN	J. W. BROWN	J. W. BROWN	ISSUED FOR FAB
9	10/1/55	J. W. BROWN	J. W. BROWN	J. W. BROWN	ISSUED FOR FAB
10	10/1/55	J. W. BROWN	J. W. BROWN	J. W. BROWN	ISSUED FOR FAB

NOTES:  
 1. CHUCKER COVER MECHANISM ASSY SEE 40216 ASSY  
 2. RETAINER BLADE MECHANISM ASSY SEE 40218 ASSY  
 3. GRAB JUICE TANK ASSY SEE 7423 ASSY



(E)  
INSTALL PART NO. T486  
WITH NARROW EDGE POINTING  
HERE

ALL WELDED CONSTRUCTION

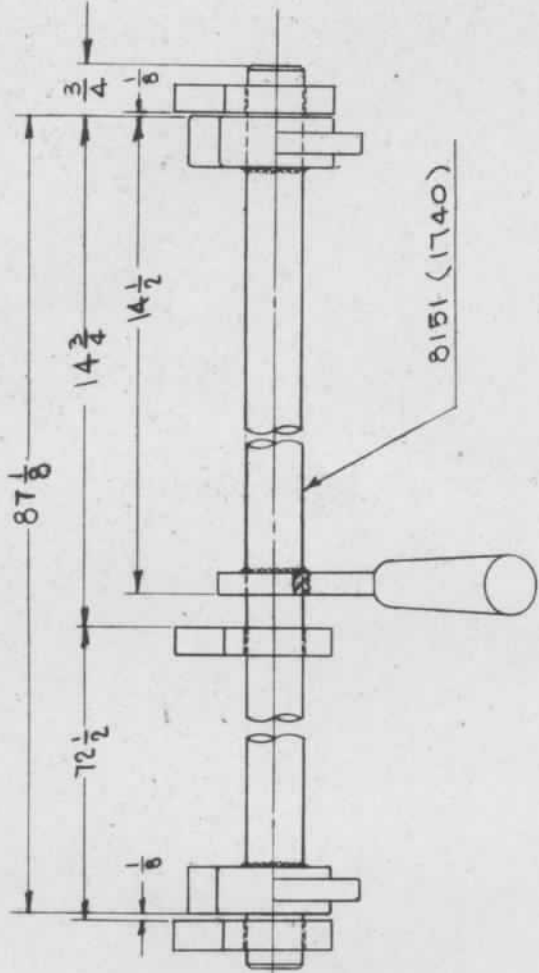
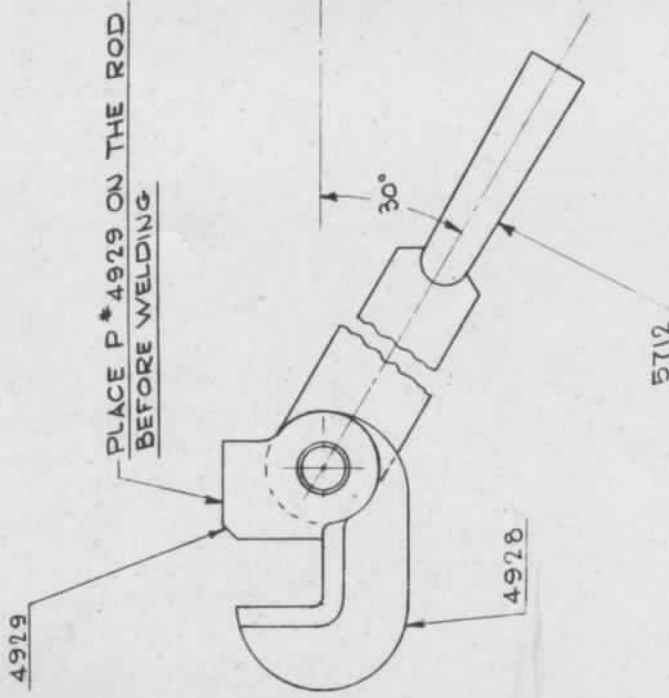
REV. 10/30

NO.	DATE	BY	CHKD.	APP'D.	REVISION
1	11/15	WAS			
2	12/15/50	WAS			
3	1/10/51	WAS			
4	1/10/51	WAS			
5	1/10/51	WAS			
6	1/10/51	WAS			
7	1/10/51	WAS			
8	1/10/51	WAS			
9	1/10/51	WAS			
10	1/10/51	WAS			

NO.	DATE	BY	CHKD.	APP'D.	REVISION
1	11/15	WAS			
2	12/15/50	WAS			
3	1/10/51	WAS			
4	1/10/51	WAS			
5	1/10/51	WAS			
6	1/10/51	WAS			
7	1/10/51	WAS			
8	1/10/51	WAS			
9	1/10/51	WAS			
10	1/10/51	WAS			

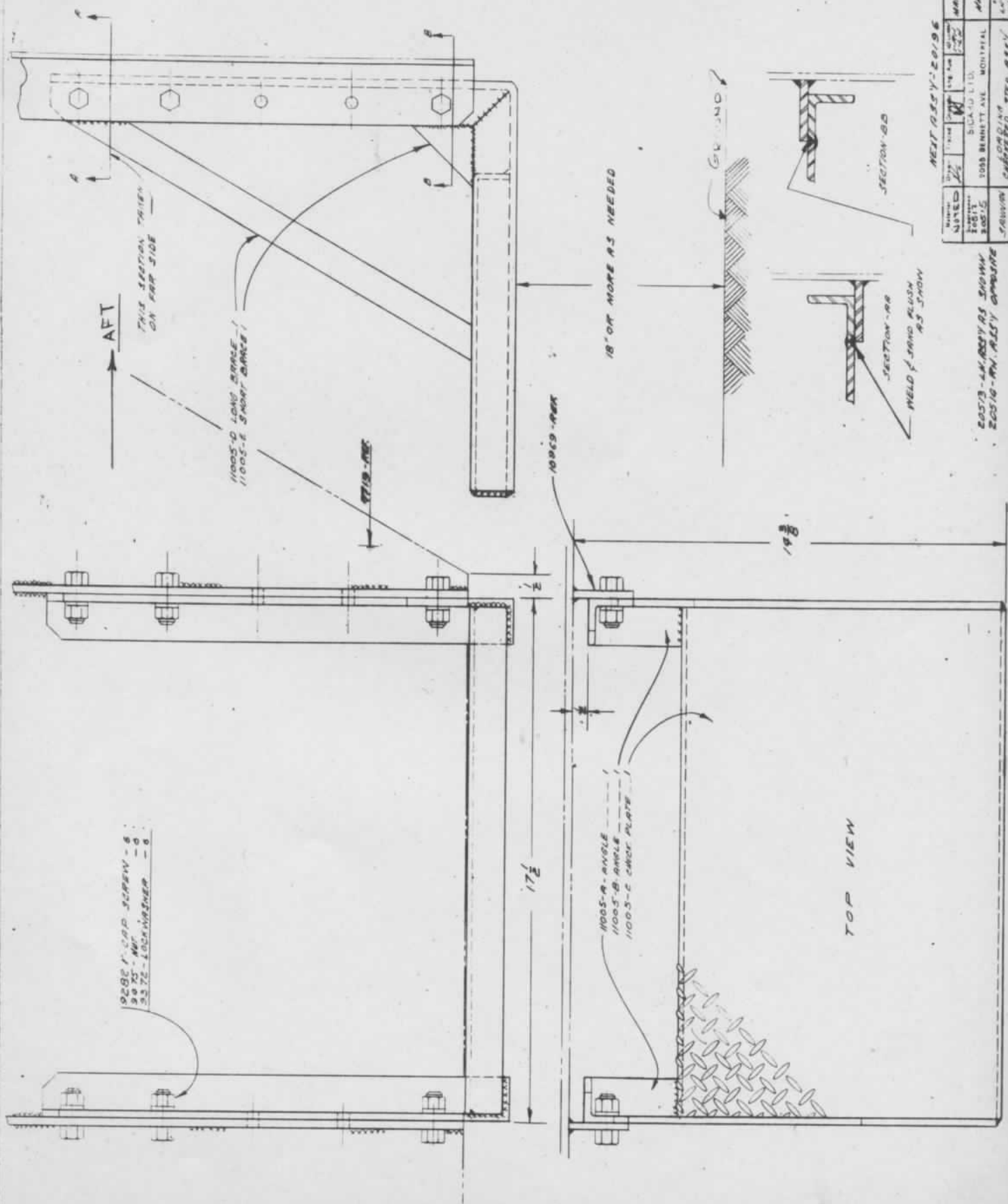
20020 LEFT HAND AS SHOWN  
20000 RIGHT HAND COMPOSITE



L	WAS	DATE	CHK	H

ASSY 20245		Drawn	Checked	Eng. App.	BUVAL	Date
Material	Supervisor	SICARD LTD.		2088 BENNETT AVE	MONTRÉAL	JUL 30-57
Qty. No.	1741	SAN. LOADING ASSY		LOCKING SYSTEM		Scale 6" = 1'-0"
						Part No.
						20245





AFT  
THIS SECTION TAKES  
ON PRR SIDE

1005-D LONG BRACE  
1005-E SHORT BRACE

17 1/2

17 1/2

14 3/8

18" OR MORE AS NEEDED

GROUND

SECTION-B-B

SECTION-A-A

WELD FLANG FLUSH  
AS SHOWN

TOP VIEW

- 1005-A - COP. SCREW - 6
- 1005-B - NUT - 6
- 1005-C - LOCKWASHER - 6

HEET DESY-20196

DATE	19 10 54	BY	W	CHKD	W	APP'D	W
REVISED	1005	1005	1005	1005	1005	1005	1005
BY	W	W	W	W	W	W	W
CHKD	W	W	W	W	W	W	W
APP'D	W	W	W	W	W	W	W
DATE	10 10 54	BY	W	CHKD	W	APP'D	W
REVISED	1005	1005	1005	1005	1005	1005	1005
BY	W	W	W	W	W	W	W
CHKD	W	W	W	W	W	W	W
APP'D	W	W	W	W	W	W	W
DATE	10 10 54	BY	W	CHKD	W	APP'D	W
REVISED	1005	1005	1005	1005	1005	1005	1005
BY	W	W	W	W	W	W	W
CHKD	W	W	W	W	W	W	W
APP'D	W	W	W	W	W	W	W

20573 - 4K BODY AS SHOWN  
20576 - 4K BODY AS SHOWN

20573  
20574

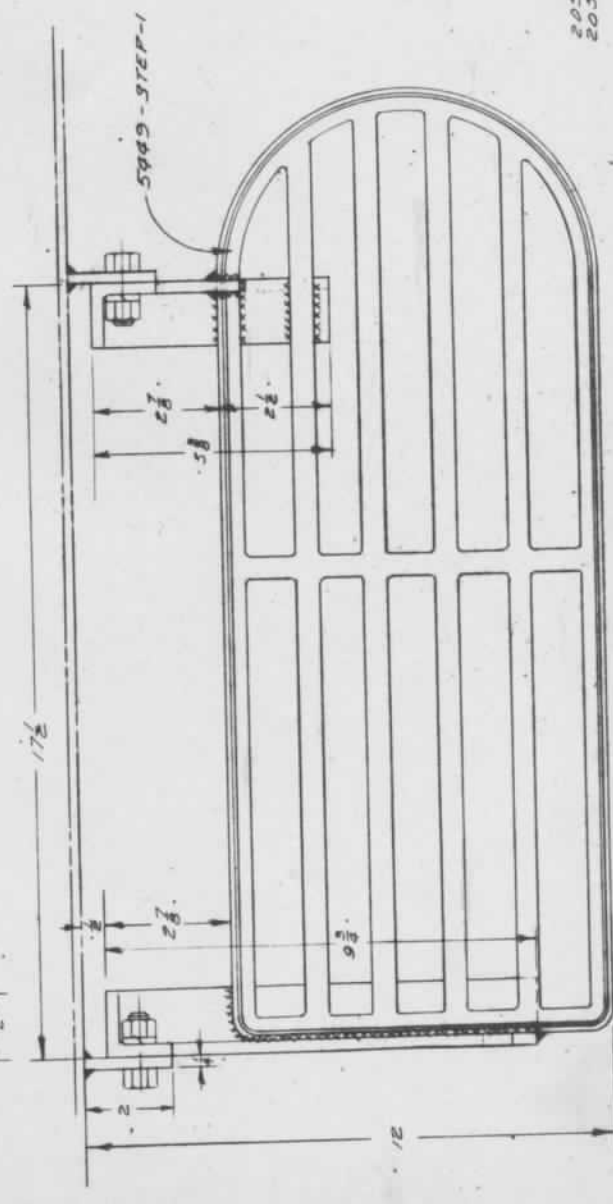
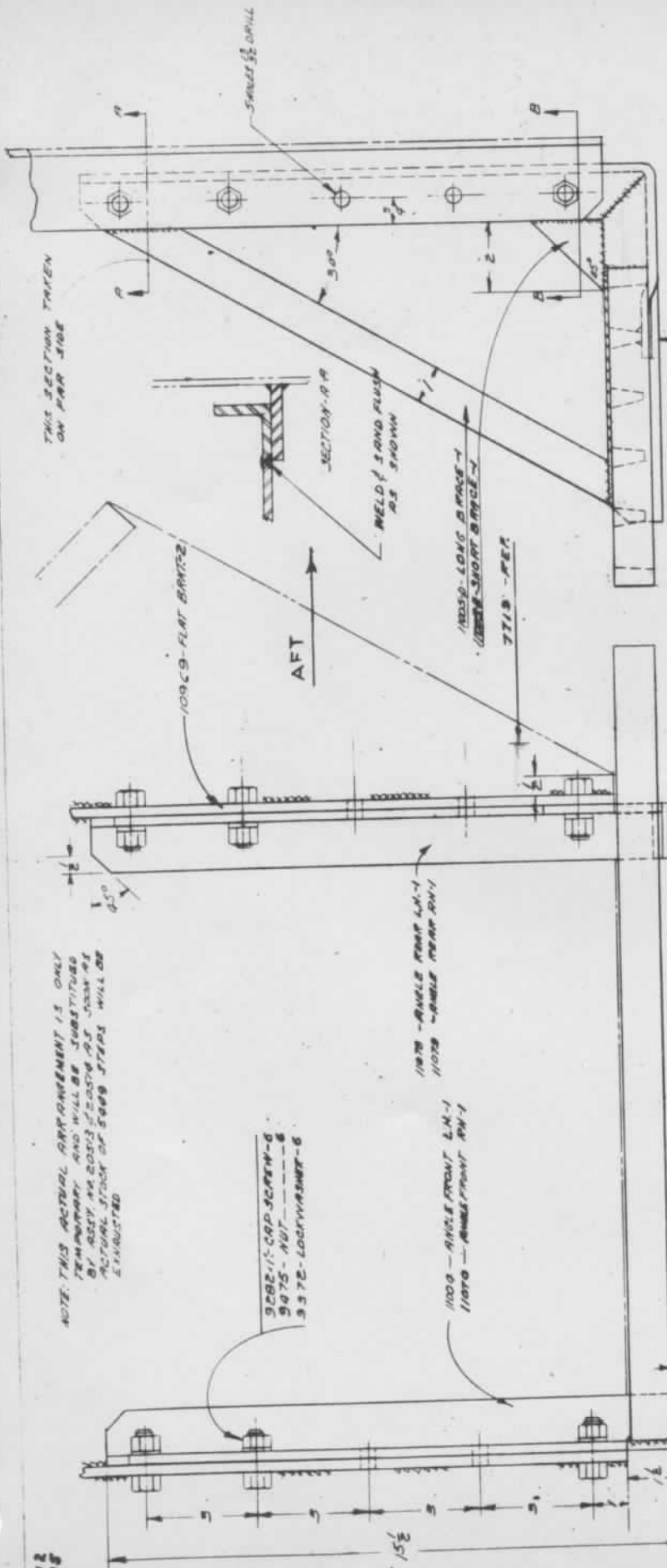
20512  
20515

NOTE: THIS ACTUAL ARRANGEMENT IS ONLY  
TEMPORARY AND WILL BE SUBSTITUTED  
BY REV. 4A 20513/20514 AS SOON AS  
ACTUAL STUDY OF 5009 STEPS WILL BE  
EXECUTED

92821-CAP SCREW-D  
9075-NUT-B  
9372-LOCKWASHER-G

1109-ANGLE FRONT L.M.-1  
1108-ANGLE REAR RH-1

1109-ANGLE REAR L.M.-1  
1108-ANGLE REAR RH-1



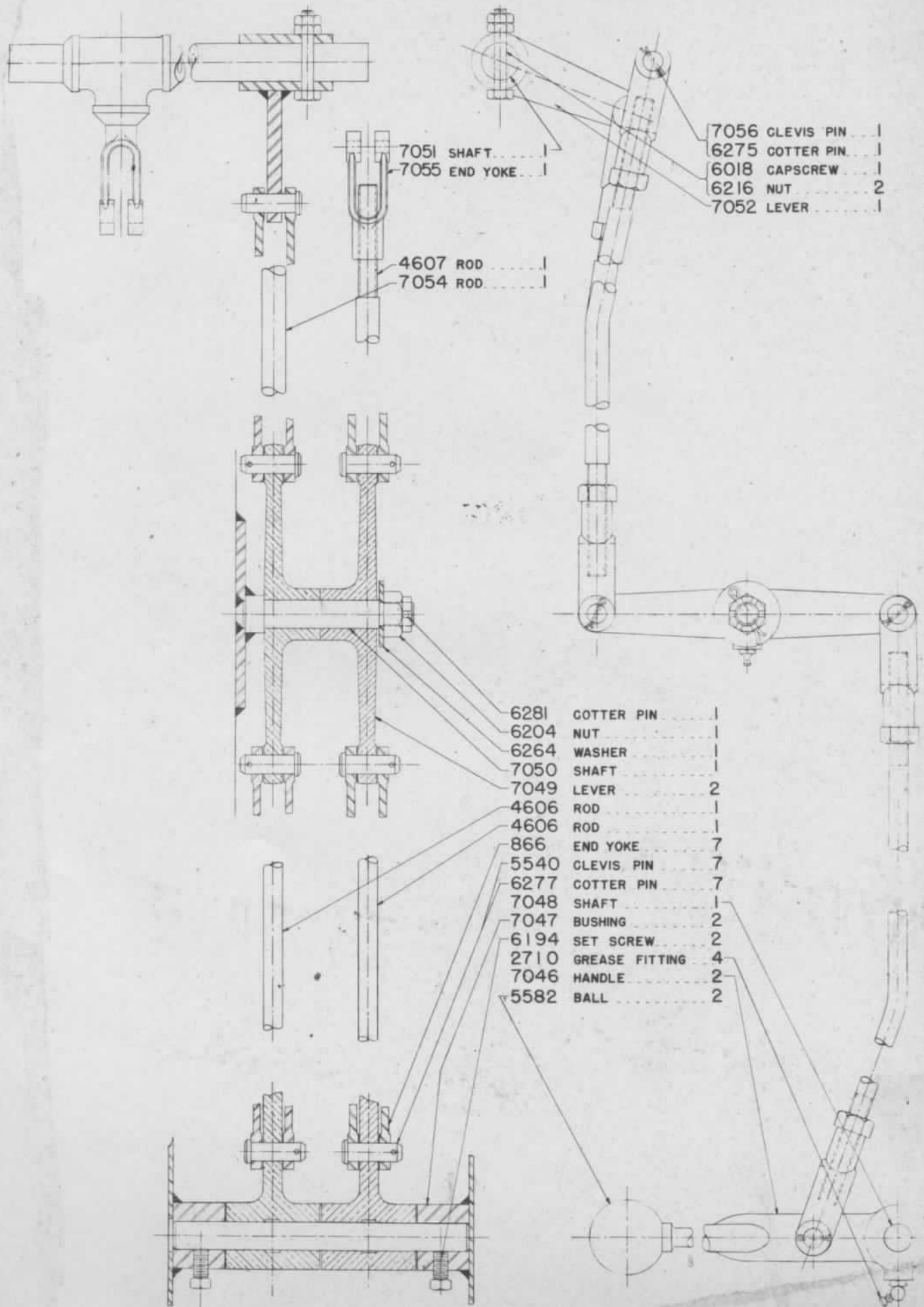
TOP VIEW



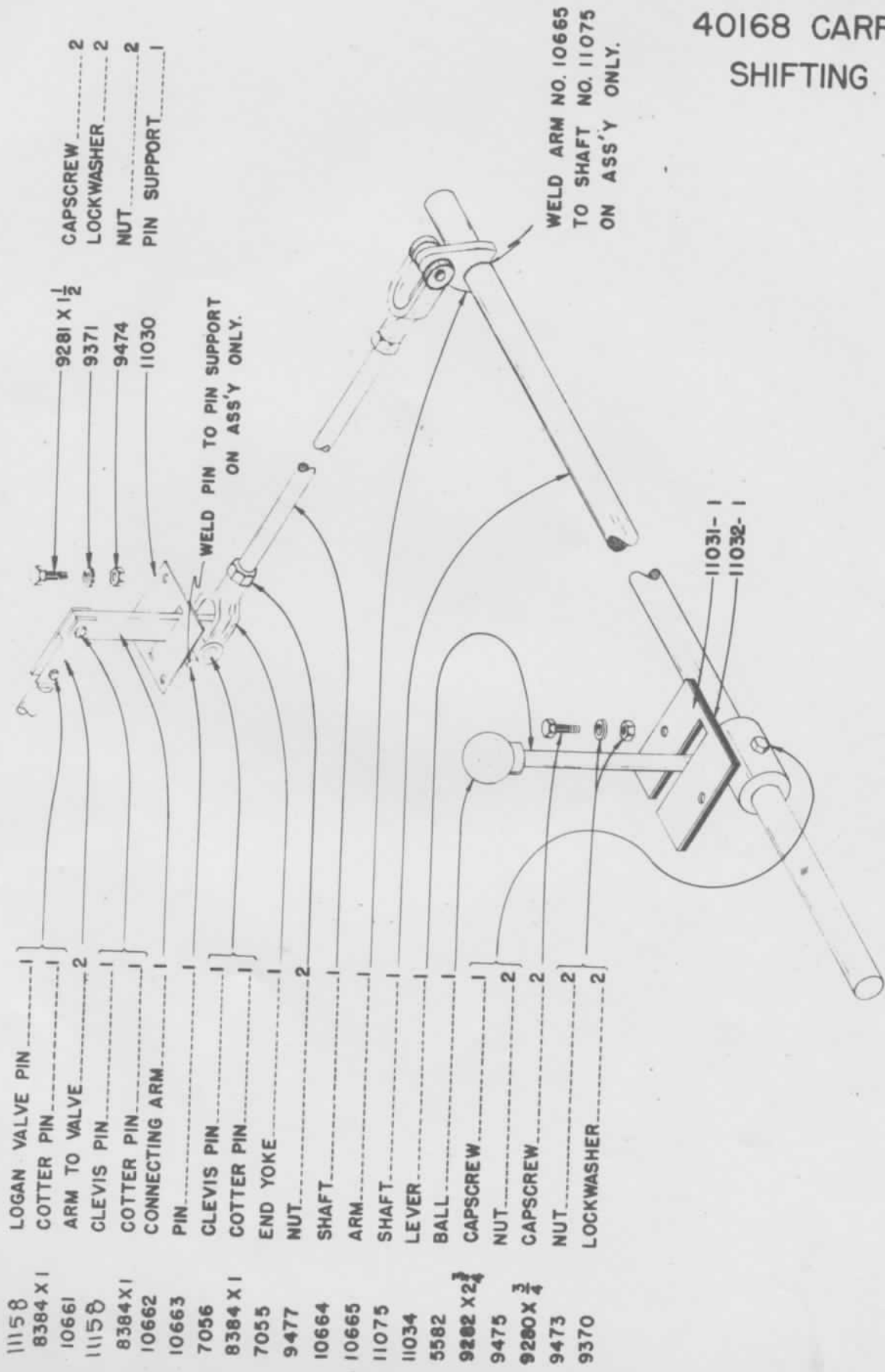
Material	Qty	Unit	Material	Qty	Unit
SICARD LTD.			SICARD LTD.		
ROSS BENNETT AVE. MONTREAL			ROSS BENNETT AVE. MONTREAL		
20512-14 AS SHOWN			20515-14 AS SHOWN		

20512-14 AS SHOWN  
20515-14 OPPOSITE

REV. 4A 20513-20515



# 40168 CARRIER CYL. SHIFTING SYSTEM



- 11158
- 8384 X 1
- 10661
- 11158
- 8384 X 1
- 10662
- 10663
- 7056
- 8384 X 1
- 7055
- 9477
- 10664
- 10665
- 11075
- 11034
- 5582
- 9282 X 2 3/4
- 9475
- 9280 X 3/4
- 9473
- 9370

- LOGAN VALVE PIN
- COTTER PIN
- ARM TO VALVE
- CLEVIS PIN
- COTTER PIN
- CONNECTING ARM
- PIN
- CLEVIS PIN
- COTTER PIN
- END YOKE
- NUT
- SHAFT
- ARM
- SHAFT
- LEVER
- BALL
- CAPSCREW
- NUT
- CAPSCREW
- NUT
- LOCKWASHER

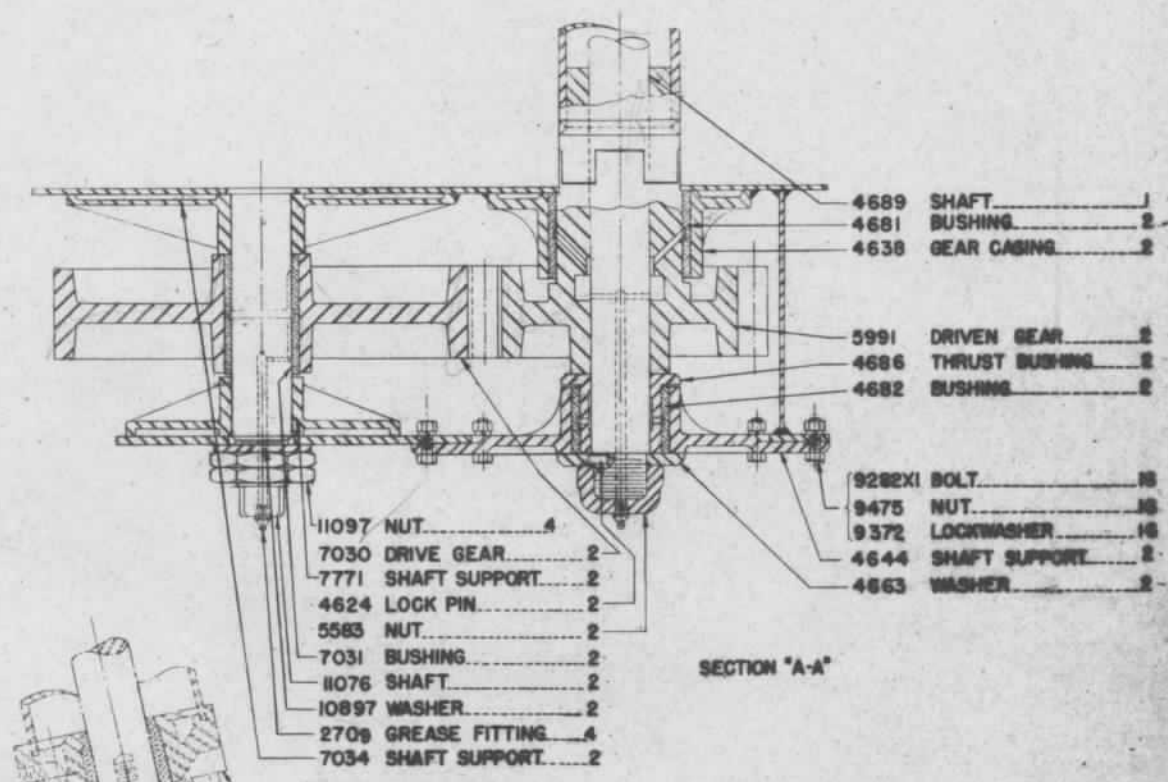
- CAPSCREW 2
- LOCKWASHER 2
- NUT 2
- PIN SUPPORT 1

WELD ARM NO. 10665  
TO SHAFT NO. 11075  
ON ASS'Y ONLY.

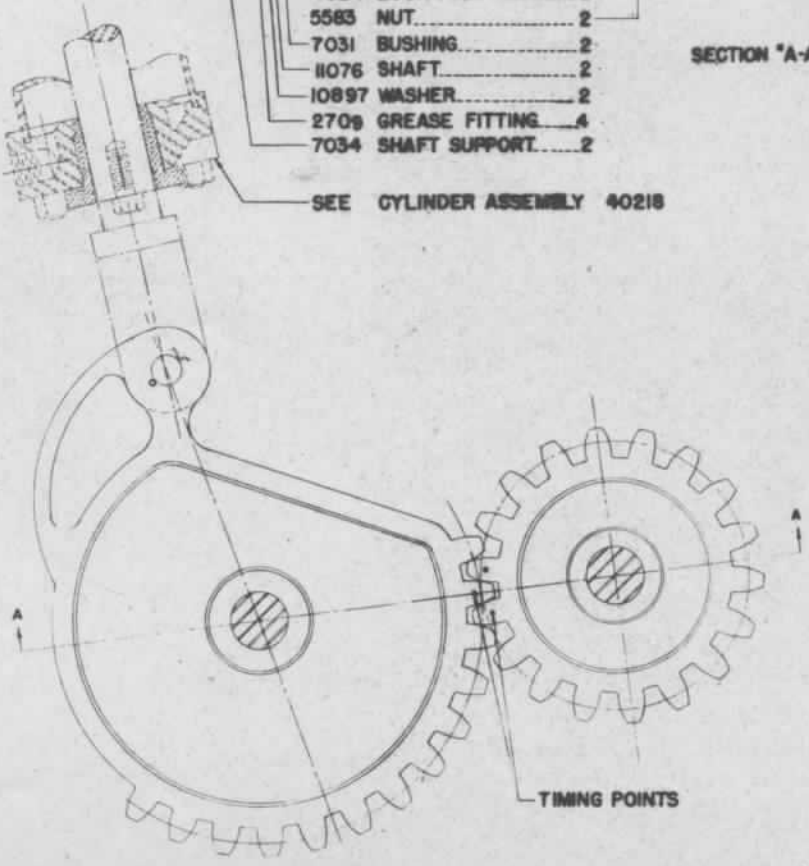
- 11031-1
- 11032-1

# COMPRESSOR COVER MECHANISM

## ASSEMBLY 40216

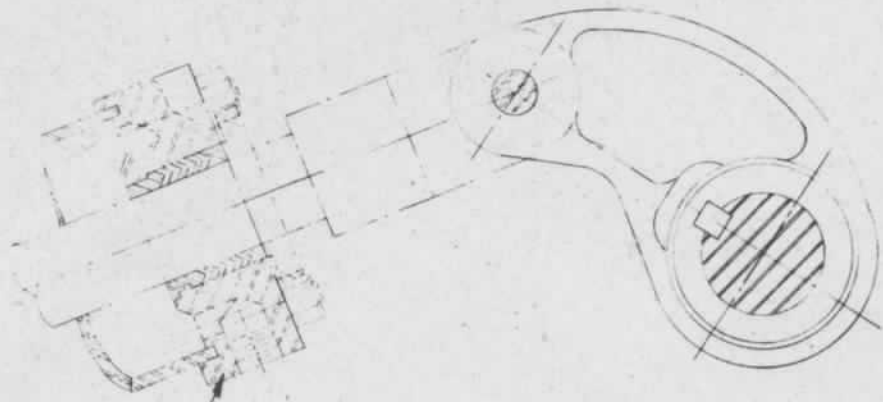


SEE CYLINDER ASSEMBLY 40218

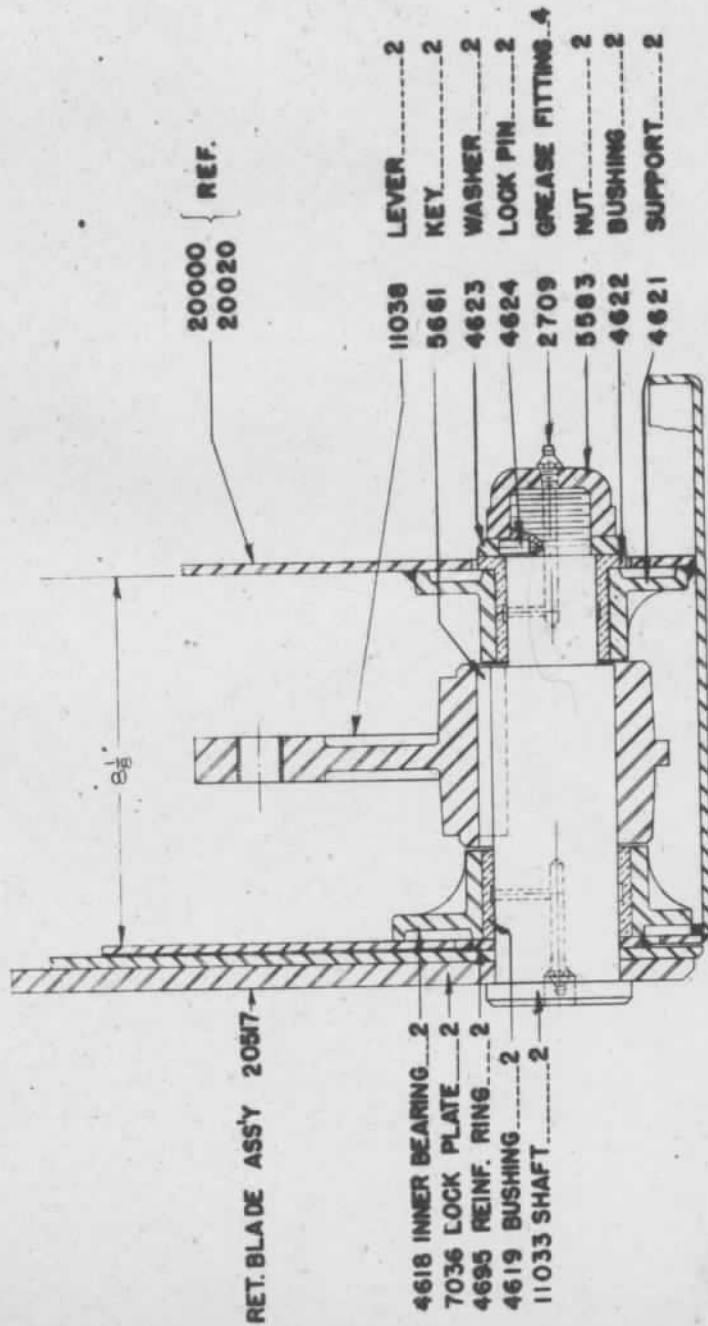


REV	DATE	BY	CHKD

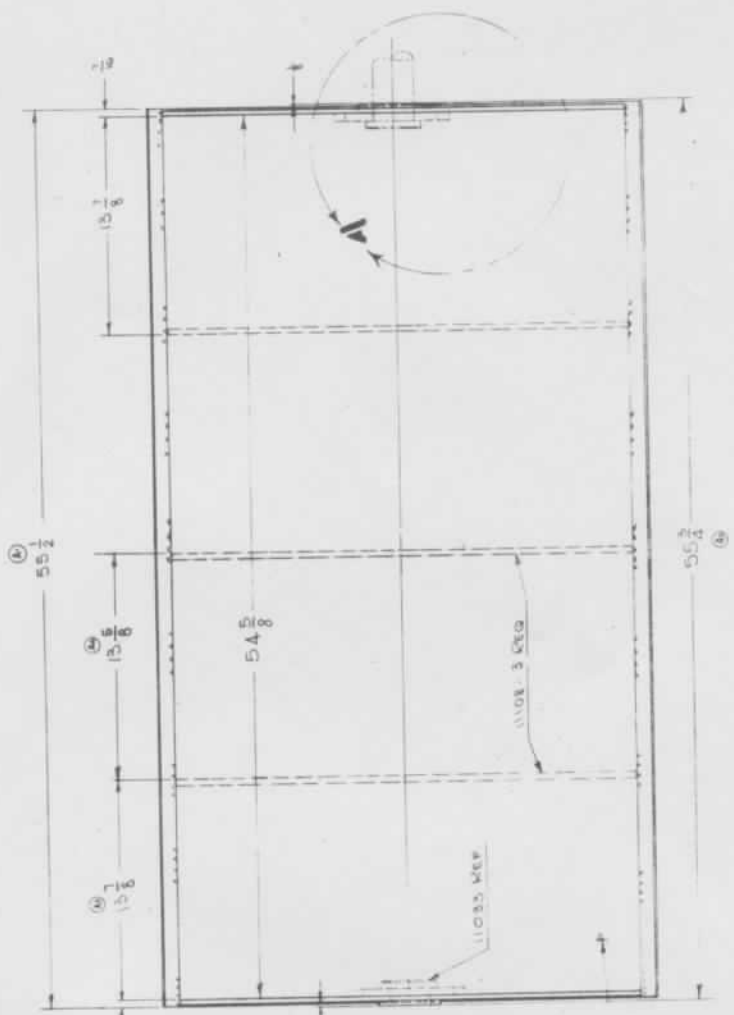
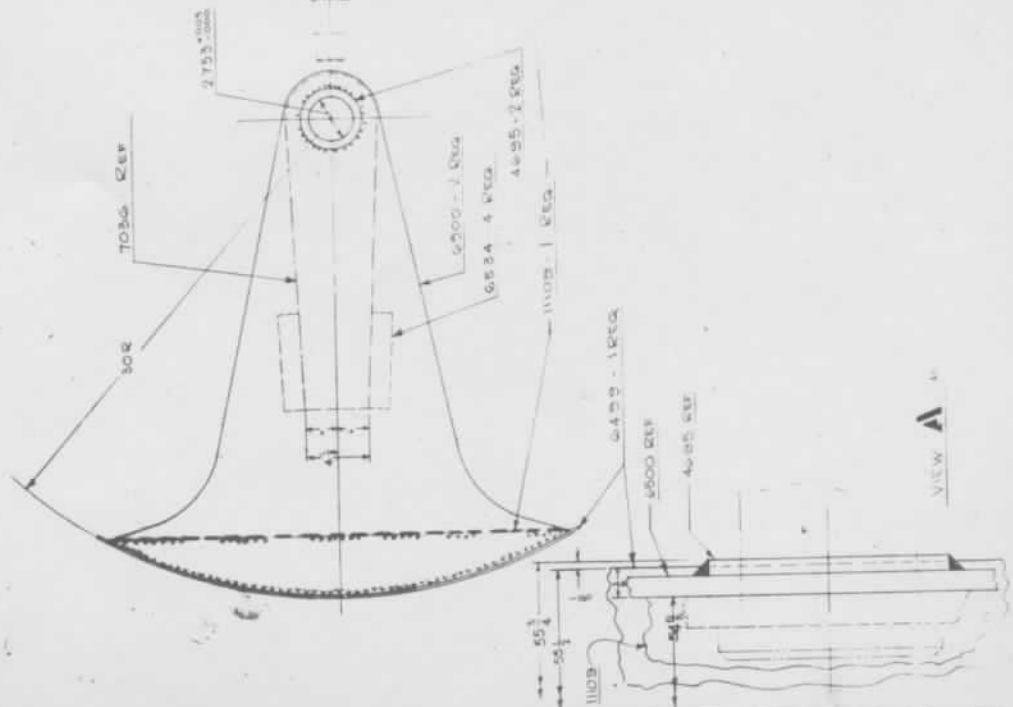
# RETAINER BLADE MECHANISM ASSEMBLY 40219



SEE CYLINDER ASSEMBLY 40218



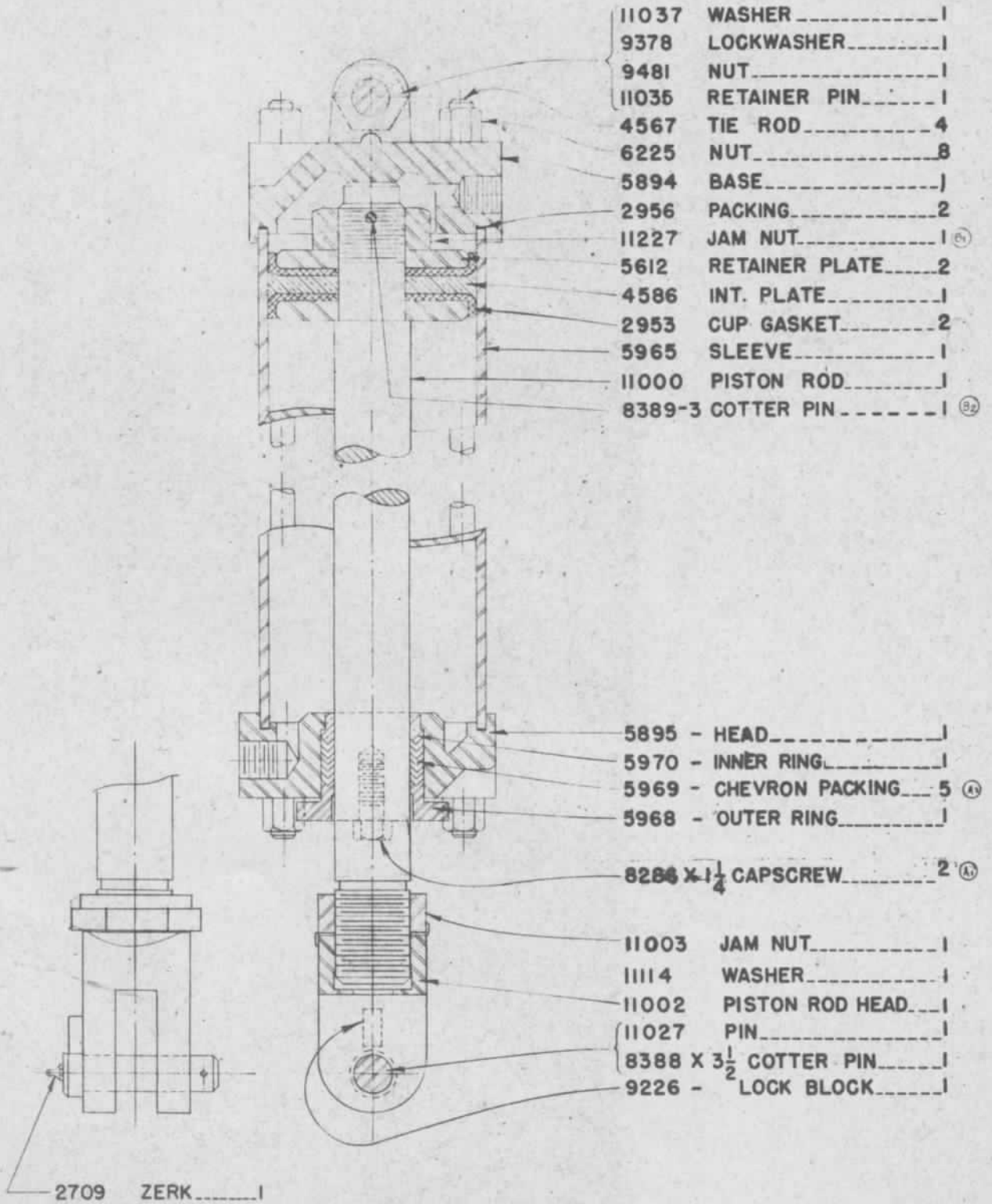
- NOTES:**
- 1-ALL WELDED CONSTRUCTION
  - 2-PART NO. 1036 IS WELDED TO PART NO. 11033 ON ARMY 40200.



DATE	BY	CHKD	APP'D
11/17/77	J. J. [unclear]	[unclear]	[unclear]
PART NO. 11033 ON ARMY 40200			
DESIGNED BY: [unclear]			
DRAWN BY: [unclear]			
CHECKED BY: [unclear]			
APPROVED BY: [unclear]			

VIEW A

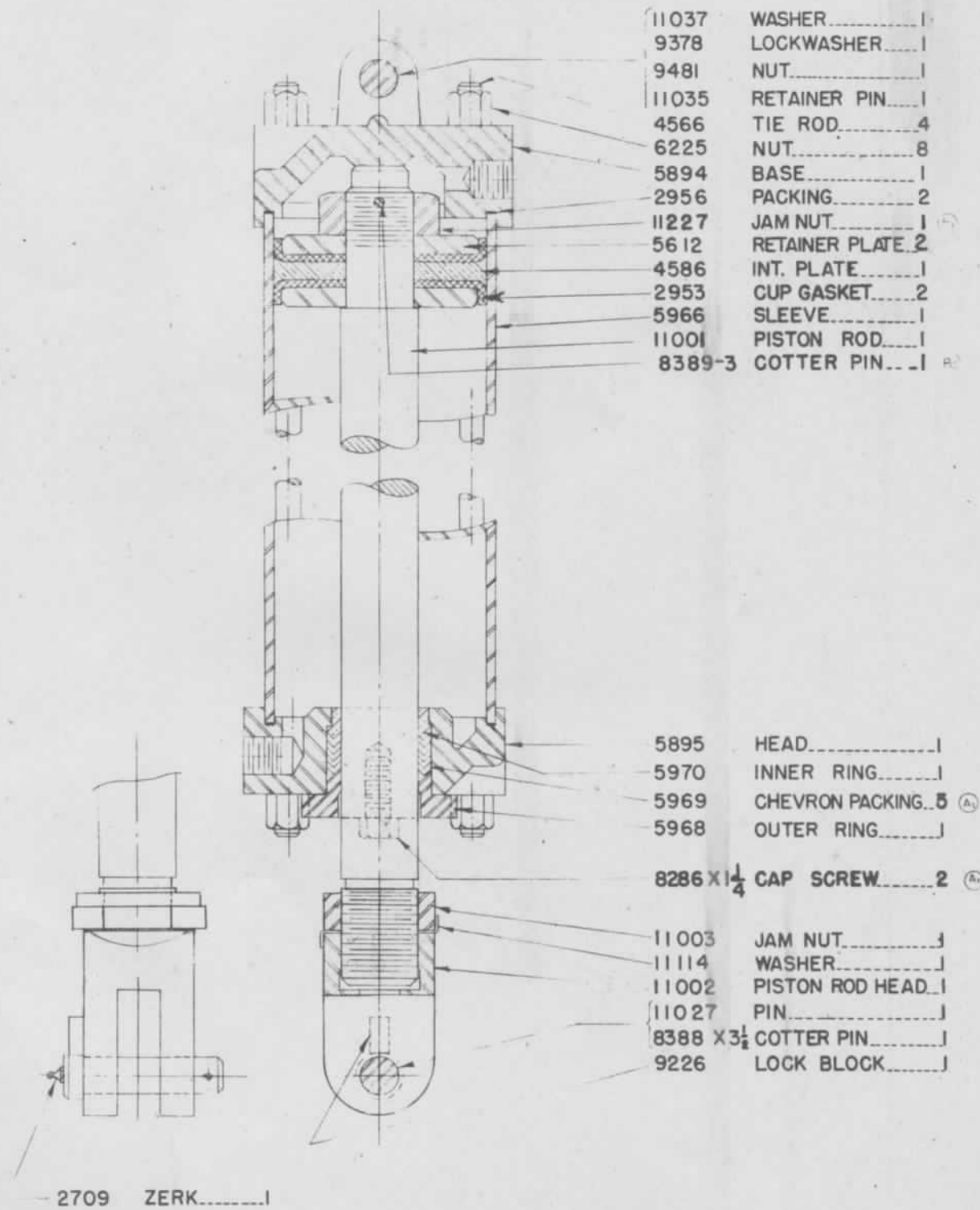
# COMPRESSOR COVER CYLINDER ASSEMBLY 40217



APPROX. 11/11/54  
 M. 2000 S. W. CHAS.  
 BOSTON - 2716  
 PL. 11.0.97  
 RE. 1377 AUG. 11



# RETAINER BLADE CYLINDER ASSEMBLY 40218

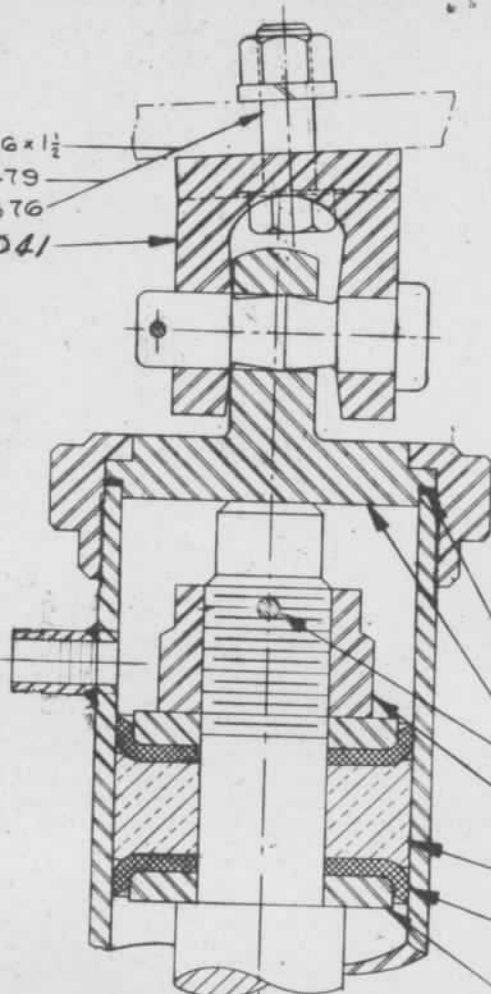


A. 11002 11003 11003  
 B. 11002 11003 11003  
 C. 11002 11003 11003  
 D. 11002 11003 11003  
 E. 11002 11003 11003  
 F. 11002 11003 11003  
 G. 11002 11003 11003  
 H. 11002 11003 11003  
 I. 11002 11003 11003  
 J. 11002 11003 11003  
 K. 11002 11003 11003  
 L. 11002 11003 11003  
 M. 11002 11003 11003  
 N. 11002 11003 11003  
 O. 11002 11003 11003  
 P. 11002 11003 11003  
 Q. 11002 11003 11003  
 R. 11002 11003 11003  
 S. 11002 11003 11003  
 T. 11002 11003 11003  
 U. 11002 11003 11003  
 V. 11002 11003 11003  
 W. 11002 11003 11003  
 X. 11002 11003 11003  
 Y. 11002 11003 11003  
 Z. 11002 11003 11003

CARRIER CYLINDER ASSEMBLY 40204

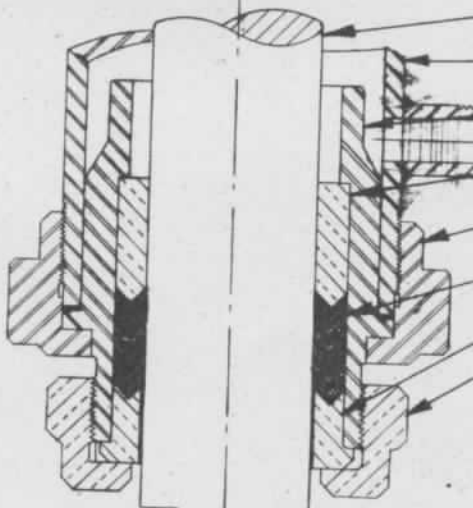
L	WAS	DATE	CHK
A	7041-4591	2-6-51	WJ
B	4605-4592	2-6-51	WJ
C	4602-4593	2-6-51	WJ
D	4602-4594	2-6-51	WJ
E	4602-4595	2-6-51	WJ
F	4602-4596	2-6-51	WJ
G	4602-4597	2-6-51	WJ
H	4602-4598	2-6-51	WJ
I	4602-4599	2-6-51	WJ
J	4602-4600	2-6-51	WJ

- 2-CAP SCREW 9286 x 1 1/2
- 4-NUT 9479
- 4-LOCK WASHER 9376
- 1-BASE BRACKET 7041

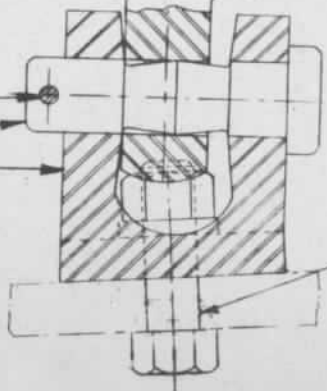


CYLINDER ASSEMBLY  
GROUP 2000  
CONSISTS OF THE FOLLOWING ITEMS

- 5160-PACKING 2
- 4601-BASE 1
- 6286-COTTER PIN 1
- 6208-CASTLE NUT 1
- 4605-PISTON 1
- 5164-LEATHER CUP 2
- 5163-RETAINER PLATE 2
- 4610-PISTON ROD 1
- 4611-SLEEVE ASS'Y 1
- 5982-SPACER 1
- 5980-INNER RING 1
- 4602-GLAND 2
- 5969-CHEVRON PACKING 6
- 5981-OUTER RING 1
- 5931-PACKING NUT 1

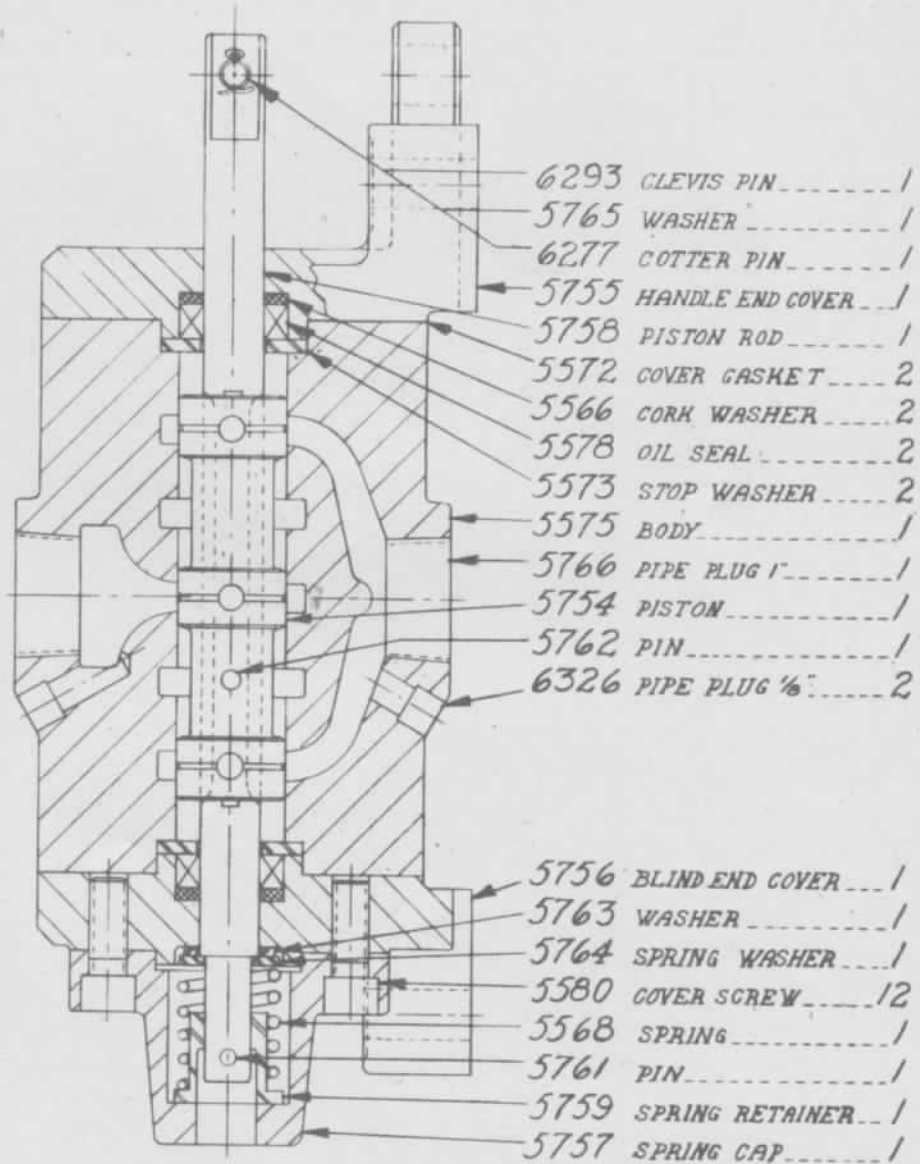


- 2-COTTER PIN 6282
- 2-HEAD & BASE PIN 4598
- 1-HEAD BRACKET 4592

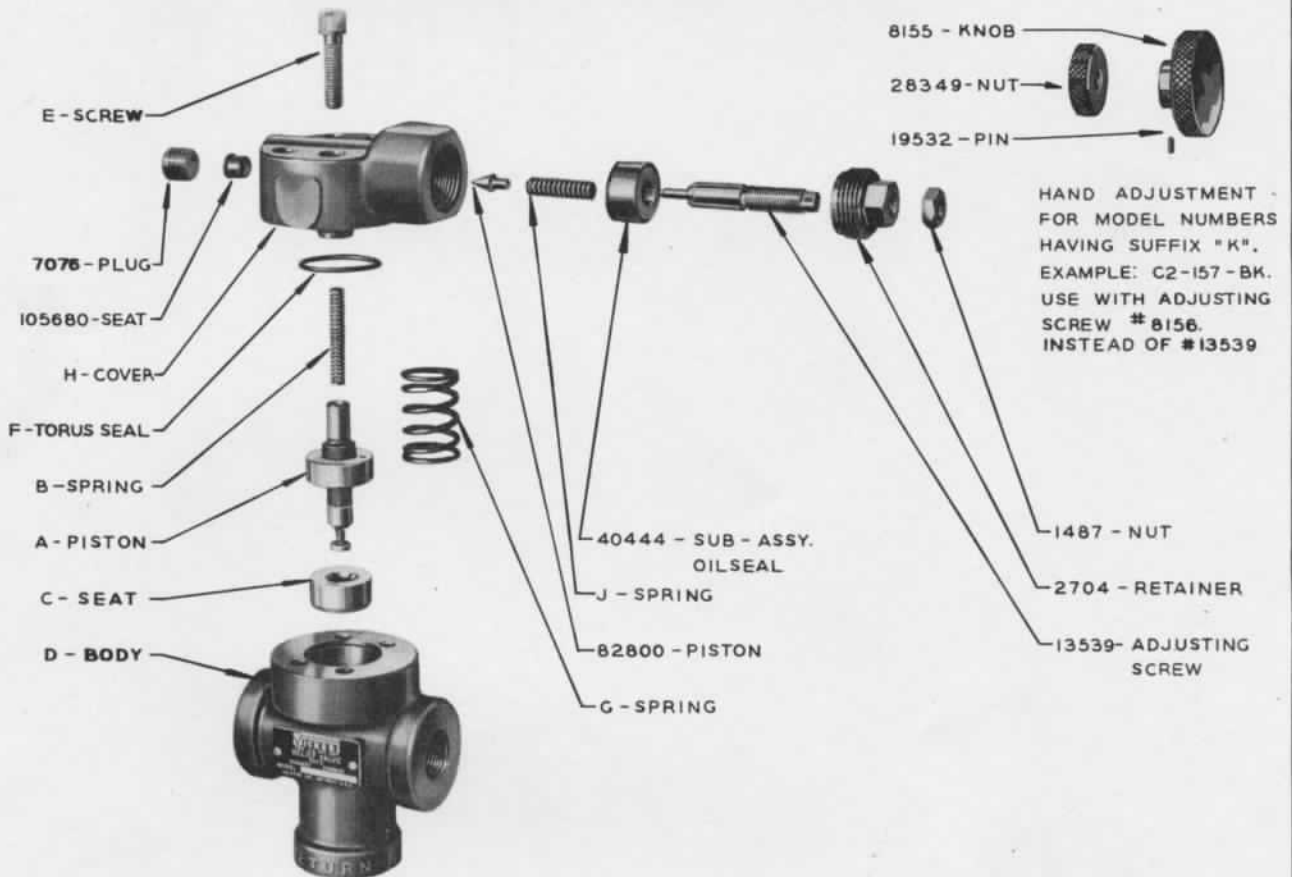


- 2 CAP SCREWS 9286 x 3/4

HYDRAULIC CONTROL VALVE ASSEMBLY 40205



**REPAIR PARTS  
FOR SERIES C2-157 & C2-167 RELIEF VALVE**



MODEL NUMBER	PIPE SIZE	PRESSURE RANGE LBS./SQ. IN.	A PISTON	B SPRING	C SEAT	D BODY	E SCREW	F TORUS SEAL	G SPRING	H COVER	J SPRING
C2-157-B	1 1/4"	75 - 1000	51563	2090	2732	106020	1115	72979		106610	2280
C2-157-BV		75 - 1000	51563	28421	2732	106020	1115	72979	28422	106610	2280
C2-157-C		500 - 2000	51563	2090	2732	106020	1115	72979		106610	2282
C2-157-CV		500 - 2000	51563	28421	2732	106020	1115	72979	28422	106610	2282
C2-157-F		1500 - 3000	51563	2090	2732	106020	1115	72979		106610	2281
C2-157-FV		1500 - 3000	51563	28421	2732	106020	1115	72979	28422	106610	2281
C2-167-B	3/4"	75 - 1000	51562	2077	56059	105660	1074	105670		105650	2280
C2-167-BV		75 - 1000	51562		56059	105660	1074	105670	28423	105650	2280
C2-167-C		500 - 2000	51562	2077	56059	105660	1074	105670		105650	2282
C2-167-CV		500 - 2000	51562		56059	105660	1074	105670	28423	105650	2282
C2-167-F		1500 - 3000	51562	2077	56059	105660	1074	105670		105650	2281
C2-167-FV		1500 - 3000	51562		56059	105660	1074	105670	28423	105650	2281

DRAWN	5-15-47	M.A.C.
CHECKED	8-27-47	N.M.
RELEASED	10-20-47	BR



## BALANCED PISTON TYPE RELIEF VALVES

(3/4" & 1-1/4" THREADED CONNECTIONS)

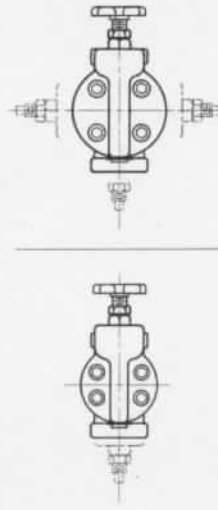
**RELIEF VALVE (FOR CONTINUOUS CONTROL OF MAXIMUM SYSTEM PRESSURE)**  
 INCLUDES APPLICATIONS REQUIRING AN ADJUSTABLE PRESSURE SET POINT OR  
 REGULATING VALVE. THESE ARE AVAILABLE IN EITHER THE LIGHT OR  
 MEDIUM TYPE. ALL VALVES ARE OF THE PATENTED VICKERS BALANCED PISTON  
 TYPE.

PRESSURE RANGE OF VALVE SHOULD BE SELECTED SO THAT EXCESSIVELY  
 HIGH WORKING PRESSURES WILL NOT BE IMPOSED UPON PUMP OR OTHER  
 EQUIPMENT.

ADJUSTMENT OF PRESSURE IS ACCOMPLISHED BY LOOSENING JAM NUT AND  
 TURNING ADJUSTING SCREW. CLOCKWISE ROTATION INCREASES PRESSURE;  
 COUNTER-CLOCKWISE ROTATION DECREASES PRESSURE.

OIL VISCOSITY RANGING BETWEEN 150 S.S.U. (LIGHT) AND 225 S.S.U. (MEDIUM)  
 AT 100°F. IS RECOMMENDED. TEMPERATURES ABOVE 150°F. IS RECOMMENDED.  
 MAXIMUM SAFE OPERATING TEMPERATURE (AS\*) REFER TO DATA SHEET 288-3  
 FOR RECOMMENDED HYDRAULIC OIL SPECIFICATIONS.

PRESSURE INLET AND OUTLET CONNECTIONS ARE CONNECTED BY A THRU  
 PASSAGE WHICH PERMITS USE OF EITHER CONNECTION AS AN INLET OR  
 AN OUTLET.



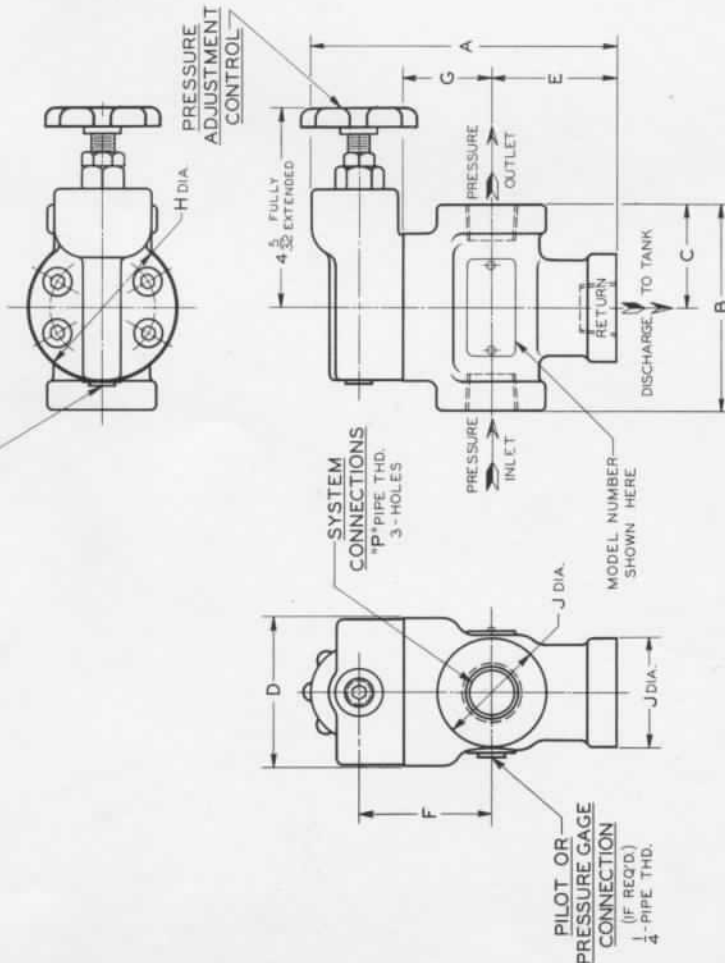
C-167 SERIES

C-157 SERIES

OPTIONAL POSITIONS OF ADJUSTING SCREW, WHICH  
 CAN BE OBTAINED BY ROTATING COVER ASSEMBLY.

VENT CONNECTION  
 3/8 PIPE THD.

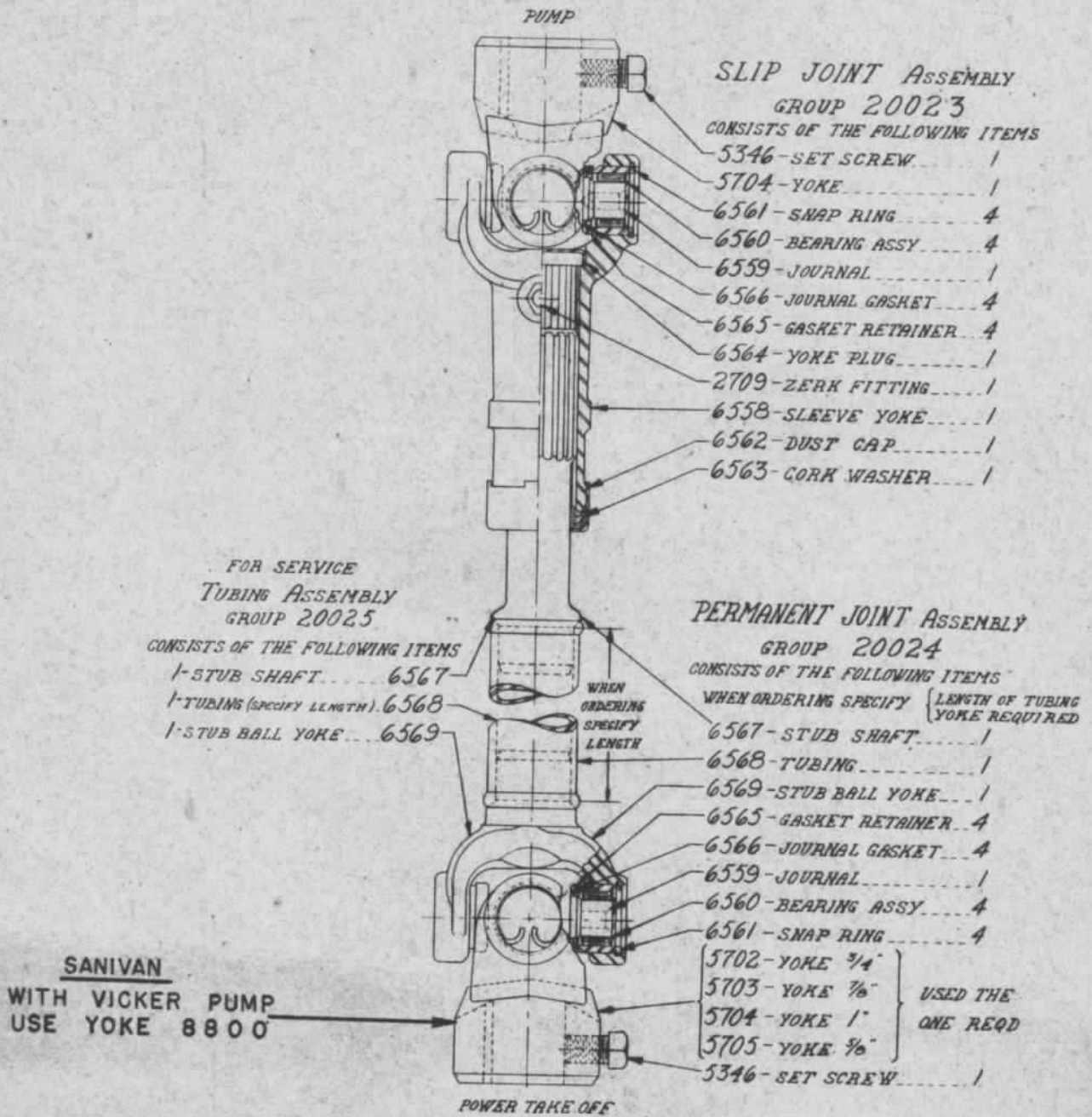
LEAVE VENT CONNECTION PLUGGED  
 EXCEPT WHEN CIRCUIT INDICATES A  
 CONNECTION FOR "VENTING" RELIEF VALVE



MODEL NUMBER	PIPE THD. CONNECTION #P#	RATED CAPACITY G.P.M.	PRESSURE RANGE LB./SQ. IN.	APPROXIMATE MINIMUM VENTING PRESSURES IN LB./SQ. INCH AT VARIOUS PERCENTAGES OF MAXIMUM RATED CAPACITY			INSTALLATION DIMENSIONS										WT. LBS. APPROX.
				25%	50%	75%	100%	A	B	C	D	E	F	G	H	J	
C-167-B	3/4	0 TO 18	75 TO 1000	16	18	20	22	6 1/4	4 1/4	2 1/8	3 1/16	2 9/16	2 11/16	1 13/16	3	2 1/4	10
C-167-BV	3/4	0 TO 18	75 TO 1000	60	64	68	72										
C-167-C	3/4	0 TO 18	500 TO 2000	16	18	20	22										
C-167-CV	3/4	0 TO 18	500 TO 2000	60	64	68	72										
C-167-F	1 1/4	0 TO 18	1500 TO 3000	16	18	20	22	7 1/2	5	2 1/2	3 3/4	3 1/16	3 7/16	2 8/16	3 3/4	3	20
C-167-FV	1 1/4	0 TO 18	1500 TO 3000	60	64	68	72										
C-157-B	3/4	0 TO 40	75 TO 1000	20	23	26	30										
C-157-BV	3/4	0 TO 40	75 TO 1000	60	65	70	75										
C-157-C	3/4	0 TO 40	500 TO 2000	20	23	26	30										
C-157-CV	3/4	0 TO 40	500 TO 2000	60	65	70	75										
C-157-F	1 1/4	0 TO 40	1500 TO 3000	20	23	26	30										
C-157-FV	1 1/4	0 TO 40	1500 TO 3000	60	65	70	75										

VICKERS Inc. EST. 1937  
 INSTALLATION DRAWING  
 THE VICKERS PATTERN CO. DETROIT, MICH.  
 THIS DRAWING RELEASED UNDER MIL-STD-883C  
 R 1053332

DRIVE SHAFT ASSEMBLY 40047

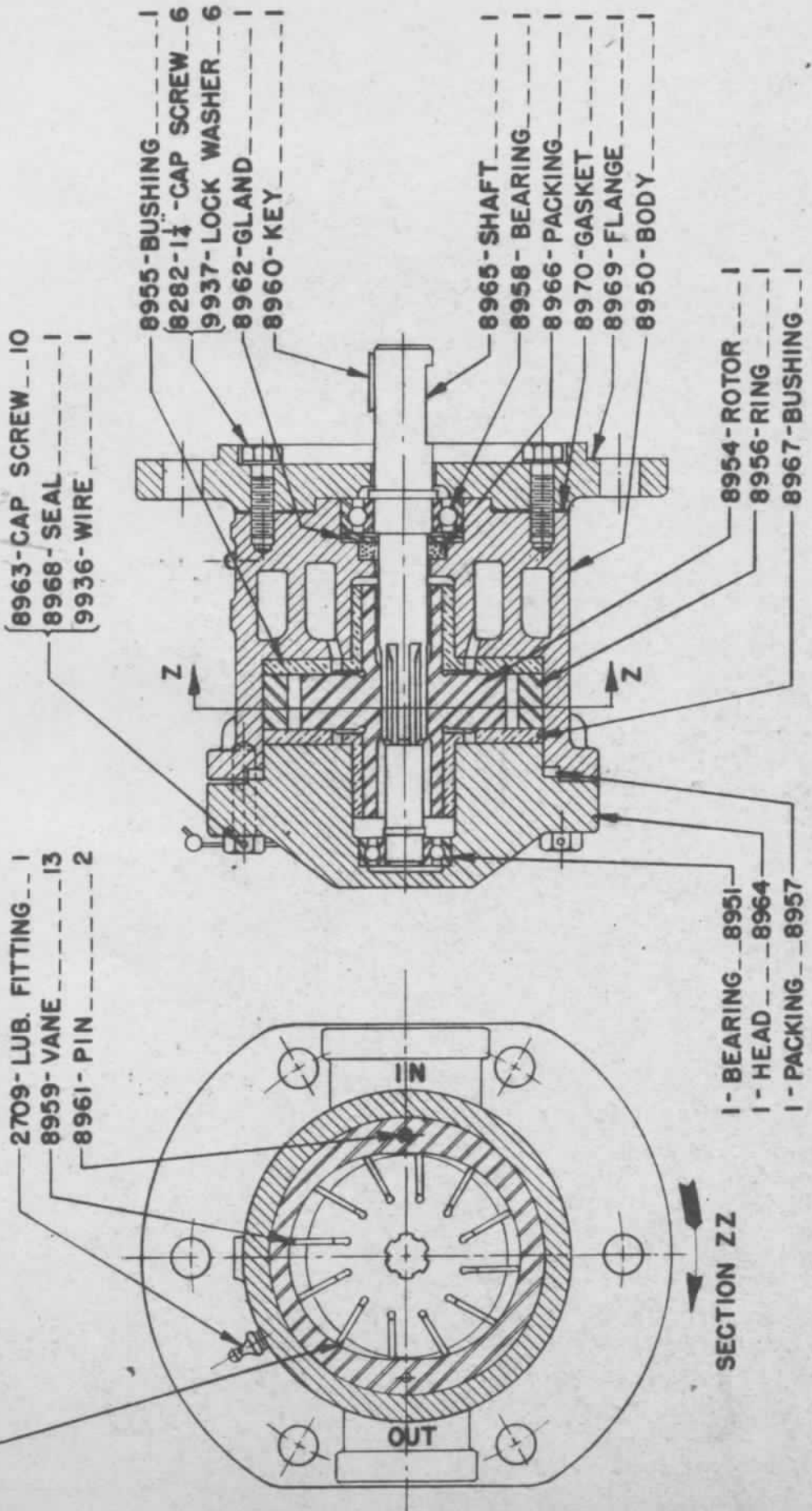




SANIVAN

VICKERS PUMP ASSEMBLY 40213

VANES MUST BE ASSEMBLED SO THAT SMALL BEVELLED EDGES ARE TRAILING, AS DETERMINED BY DIRECTION OF ROTATION.





# INSTALLATION AND MAINTENANCE INFORMATION

FOR

# VICKERS

SERIES V-2100  
**VANE TYPE  
 HYDRAULIC PUMPS**  
**FOR MOBILE  
 INSTALLATIONS**  
 MAXIMUM PRESSURE  
 RATING 1000 psi

Data in this bulletin applies to each of the following itemized series of pump models, either in major part or in entirety. The numbers listed are basic model numbers, variations of which are denoted by letter suffix designations added to the basic number. Always give complete model identifications, as stamped on pump, when ordering repairs or replacements.

## FOOT MOUNTING



V-2104-A  
 V-2104-C  
 V-2104-D  
 V-2104-E  
 V-2104-F

V-2124  
 V-2134  
 V-2134U  
 V-2134X  
 V-2144

V-2124-57  
 V-2134-57  
 V-2134U-57  
 V-2134X-57  
 V-2144-57

double pumps  
 V-2149-D-57  
 V-2139-C-578  
 V-2139X-C-5108

## NO MOUNTING



V-2111-A  
 V-2111-C  
 V-2111-D  
 V-2111-E  
 V-2111-F

V-2111-A-569  
 V-2111-D-569  
 V-2111-A-588  
 V-2111-D-588  
 V-2111-A-593  
 V-2111-D-593  
 V-2111-A-S114  
 V-2111-C-S114  
 V-2111-C-S151

V-2025  
 V-2035  
 V-2035U  
 V-2035X  
 V-2045

V-2035X-57  
 V-2035-578  
 V-2035X-578  
 V-2045-578  
 V-2025-593  
 V-2035-593  
 V-2035U-593  
 V-2035X-593  
 V-2045-593  
 V-2035-S113  
 V-2035U-S113  
 V-2035X-S137  
 V-2035X-S137

double pumps  
 V-2110-EA-588  
 V-2110-EC-588  
 V-2110-ED-588  
 V-2039X-C-57  
 V-2039-C-S107

## FLANGE MOUNTING



V-2105-A  
 V-2105-C  
 V-2105-D  
 V-2105-E  
 V-2105-F

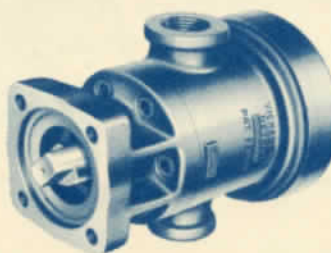
V-2105-A-567  
 V-2105-C-567  
 V-2105-A-584  
 V-2105-C-584  
 V-2105-E-584  
 V-2105-A-588  
 V-2105-C-588  
 V-2105-D-588  
 V-2105-A-S145

V-2125  
 V-2135  
 V-2135U  
 V-2135X  
 V-2145

V-2125-57  
 V-2135-57  
 V-2135U-57  
 V-2135X-57  
 V-2145-57

V-2135-588  
 V-2135-S121  
 V-2135X-S121  
 V-2145-S121

## POWER TAKE-OFF MOUNTING



V-2105-A-S57  
 V-2105-C-S57  
 V-2105-D-S57  
 V-2105-E-S57  
 V-2105-F-S57

V-2125-S57  
 V-2135-S57  
 V-2135U-S57  
 V-2135X-S57  
 V-2145-S57

Vickers products are warranted against defective material and workmanship for a period of ninety days from date of purchase. Due to installation and operating conditions being beyond our control, all replacement parts and service

expense other than that shown to be caused by defective material or workmanship within this period, must be charged for at our established rates. Each individual unit is tested at maximum rated conditions of operation prior to shipment.

# INSTALLATION and MAINTENANCE INFORMATION for

Vickers Vane Type Pumps are designed and built for continuous operation at high pressures and will stand up a long time under severe working conditions if properly installed and a **good quality clean oil** is used. Proper installation and maintenance are the essential factors in obtaining satisfactory operation and long service. It has

been found from experience that the following instructions have proven extremely important and helpful in obtaining the best results from Vickers Vane Type Pumps. Many of these simple points may easily be overlooked, and it is therefore suggested that each be checked carefully.

## DESCRIPTIVE INFORMATION

Descriptive bulletins or installation drawings are available on each pump model; they give information

as to usage and installation. Typical circuit diagrams are shown on some of these data for convenient reference.

## OPERATION

These Vane Pumps deliver a given amount of oil per minute to the hydraulic operating system at any given drive speed and at working pressures up to the maximum of 1000 lbs. per sq. inch. This amount of oil, termed the delivery rate, is chiefly dependent upon the size rating of the pump and the speed at which the pump is driven. The descriptive data lists delivery rates at various operating conditions. Ordinarily Vickers Vane Pumps are rated at a drive speed of 1200 rpm. At other drive speeds (within the speed range recommended in installation and engineering information) the delivery rate and power input will be approximately proportional.

Pump operation is briefly as follows: The slotted rotor is driven by a splined shaft; a vane in each slot slides radially as the rotor revolves. Centrifugal force and fluid pressure cause the vanes to follow the inside cam contour of a hardened and ground ring, which is so shaped that two opposing pumping chambers are formed with side valve plate bushings having ports for the intake and discharge of the oil. Because the vanes are initially ejected by centrifugal force, it is essential that the minimum drive speed should not be below the minimum recommended, until the pump is primed and pressure built up.

TO PREVENT SERIOUS DAMAGE  
READ INSTRUCTIONS CAREFULLY  
BEFORE STARTING PUMP IN SERVICE

DO NOT TIGHTEN  
HEAD SCREWS  
EXCEPT PER  
INSTRUCTIONS

SPECIFY COMPLETE  
PUMP MODEL NUMBER  
WHEN ORDERING PARTS

Fig. 3

SHAFT ROTATION  
MUST BE IN  
ACCORDANCE WITH  
ARROW ON BODY

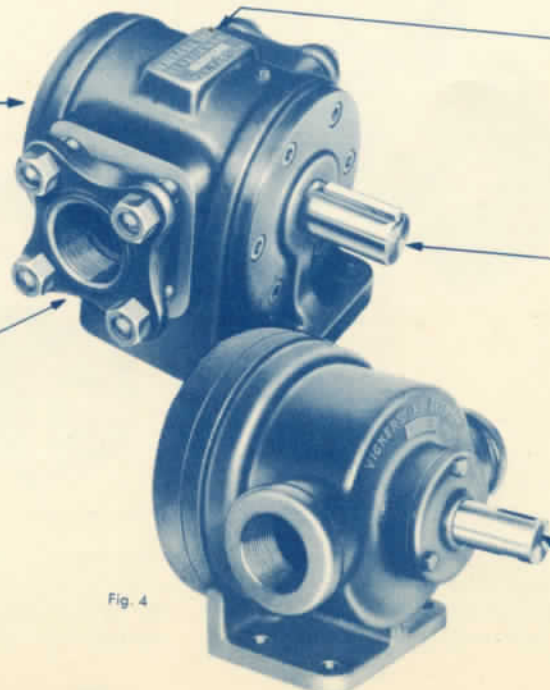
AIR LEAK INTO  
SUCTION LINE  
WILL CAUSE NOISY  
OPERATION AND  
MAY PREVENT PRIMING

USE CLEAN OIL  
PER INSTRUCTIONS  
AND CHECK OIL  
LEVEL IN TANK

MAXIMUM PRESSURE  
RATING  
1000 PSI

Fig. 4

CHECK ALIGNMENT  
OF DRIVE COUPLING  
AFTER MAKING  
PIPING CONNECTIONS



## STARTING PUMP IN SERVICE

**Major precautions** which must be taken during installation and starting of pumps are listed hereafter. Check these very thoroughly to prevent damage. Prior to shipment, each pump has been run through a complete series of tests at maximum operating pressure and under actual operating conditions.

**Direction of shaft rotation** must be as shown by arrow marking, or pump will seize after a few seconds operation due to lack of oil. Result will be broken and scored parts. Pumps are normally assembled for right-hand rotation, viewing pump from drive shaft end. If pump rotation must be changed, reference should be made to special data titled "Changing Direction of Rotation" (see page 5). All pumps for left-hand rotation, viewing pump from drive shaft end, bear model number suffix letters "L.H."

**Oil supply must be clean** and free of scale, chips, filings, paint, lint, sludge, water and other abrasives or impurities. Dirty oil will quickly wear out pumps and valves, just as it will any other hard working precision mechanism. A properly made installation protects the system by an air filter at the tank breather vent if air is dusty, by an intake oil filter if special precautions require it, by filler opening screens, and by proper tank construction which provides baffles and clean-out openings.

**Proper oil viscosity** should be designated on a plate near the filler opening. Ordinarily a medium hydraulic oil (225 S.S.U. @ 100° F.) or a light hydraulic oil (150 S. S. U. @ 100° F.) is recommended, this being usually correct for air temperatures of 50° F. to 90° F. Be certain that a good grade of oil is used which has high resistance to oxidation and chemical deterioration under hydraulic working conditions. (Refer to data sheet 417-S for recommended hydraulic oil specifications.)

**Oil supply must be adequate and reach pump immediately** after starting, as pump relies upon this oil for lubrication of closely fitted parts and will be damaged within a few seconds if intake oil is not available because of low tank level, clogged intake filter, or leak in suction line which would prevent priming. Seizure, with resulting broken and scored parts, will result if drive motor or engine is not shut down immediately.

**Shaft alignment** should always be checked, as misalignment (even with flexible coupling drive) will cause shaft packing wear, bearing failure and perhaps shaft breakage. Misalignment is often caused by improper piping, which imposes a strain on the pump body. Excessive belt loads are also detrimental. Pump drive should be in accordance with accepted practice; if further information is desired see Vickers Data Sheet 822-S. On belt driven installations the belt should **not** be tightened excessively.

**Overload protection** must be furnished by a relief valve in the pressure outlet line to the control circuit. This relief valve limits the hydraulic system pressure and pump pressure to the desired maximum. As long as this relief valve is not adjusted to a pressure above the maximum rating of the pump, the pump will not be damaged by excessive pressure. (Relief valve adjustment should be as low as possible to perform the required work, as this reduces load on both drive motor and hydraulic system.)

**Head take-up screws (A)** must not be tampered with except when dismantling and reassembling pump. They are correctly adjusted at the factory under actual operation; should they be tightened the pump may seize because of internal binding. (The clearance opening around the pump head is normal.)

SKETCH INDICATING TYPICAL INSTALLATION OF VANE PUMP AND MAJOR SERVICE PRECAUTIONS

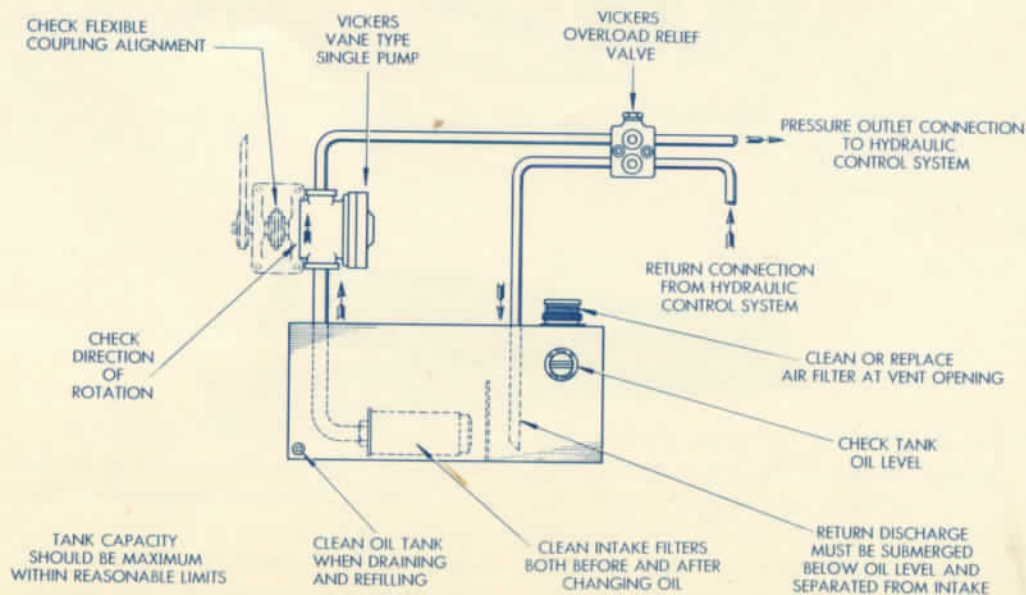


Fig. 5

## ADJUSTMENTS

No adjustments are required. Shaft packing is not subjected to pressure, and normally does not require replacement unless damaged due to shaft misalignment. Vanes automatically compensate for any normal wear.

The Vane Pump, being of the "constant delivery" type, has no volume adjustment. However, it is possible to change the delivery rate by substituting a different

pumping cartridge in the pump housing if necessitated by some change in conditions of operation of the machine. There are several cartridge sizes available for each size of housing. (See descriptive and parts data.) **Model number on pump should be altered accordingly if any changes are made from the original parts.**

## CAUSES OF PARTS FAILURE

**Breakage of parts** in the pumping cartridge, such as rotor or vanes (also twisted or broken shafts), will be caused by:

- Excessive pressure above maximum pump rating.
- Seizure due to lack of oil supply.
- Solid matter being wedged into pumping cartridge.
- Excessive tightening of head screws (A) with wrench.

**Excessive wear** on pumping cartridge parts, such as cam ring, valve plate bushings and vanes (also bearings and shaft packing) will be caused by:

Abrasive matter in the oil being circulated through pump.

Thin oil of too low a viscosity for the working conditions.

Sustained high pressure above maximum pump rating.

Drive misalignment or tight belt drive.

Air recirculation causing chatter in system.

**Breakage of pump body** infrequently occurs, but it can be caused by:

High overload impact pressures (causing internal breaks in cored parts).

Over-tightening of pipe fittings (causing external breaks at connections).

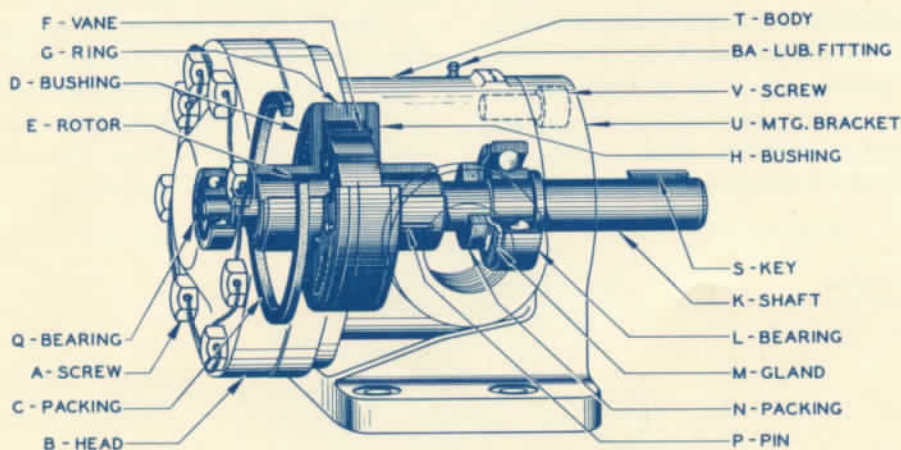


Fig. 6

## PROCEDURE WHEN DISMANTLING AND REASSEMBLING

**Inspection of pumping cartridge parts in the Vane Type Single Pump can be made as follows:**

The pumping cartridge consists of the rotor (E), vanes (F), valve plate bushings (D & H), and cam ring (G). All moving parts, except shaft and shaft bearings, operate within this cartridge assembly. No moving parts therefore are in contact with the body (T).

To remove the parts comprising the pumping cartridge it is unnecessary to remove the pump from its drive position, disconnect the piping, or detach the drive coupling (unless the pump is inaccessibly located). Remove the head screws (A), and the head (B). The head-end valve plate bushing (D) can then be pulled out, leaving exposed the rotor (E), vanes (F) and cam ring (G).

# VICKERS VANE TYPE SERIES V-2100 PUMPS

Be particularly careful to note the position of the rotor and vanes, also the position of the ring pin (P). These parts may all be reassembled incorrectly if not carefully checked, because of the fact that provision is made in the design for either right-hand or left-hand assembly. The position of cam ring (G) should also be noted carefully.

These parts can all be removed for inspection, and the shaft-end valve plate bushing (H) will then be exposed. It too can be removed by a hook-shaped tool. Parts that may show damage or excess wear should be replaced. The vanes can be turned end-for-end so that the inside edge is now against the cam ring . . . thus renewing the vanes for future service. (Worn edges must be stoned so vanes move freely in rotor slots, and beveled edges must trail direction of rotation.)

Reassemble in reverse order with parts replaced in original positions, using parts drawing notes as a supplementary guide. Renew head ring packing (C) if it has become compressed or damaged, otherwise air will be drawn in when pump is started. Assemble the pump head so that ring pin hole in same registers with protruding part of ring pin (P).

Extreme caution must be taken when reassembling parts to make certain that no grit or lint gets into vane slots or between assembled parts. Not only may this cause a vane to stick, but it may also cause damage to valve plate bushings. A small amount of foreign matter also will give a false indication of head screw adjustment . . . thereby impairing pump efficiency. Wash

parts in kerosene and use every reasonable precaution against dirt.

When reassembling a pump, the head take-up screws (A), if tightened excessively, can cause binding between the rotor (E) and the two valve plate bushings (D & H). It is very important that these take-up screws be drawn up moderately and evenly. Rotate the pump shaft by hand while gradually tightening first one and then another of the head screws, until all have been pulled up evenly without causing the shaft to bind. Sometimes an additional  $\frac{1}{8}$ th turn is given after the pump has been run a short period. Insert wire through screw heads so that adjustment will be maintained.

## Inspection of shaft, shaft bearing, and shaft packing can be made as follows:

The opposite end of the pump must be opened to gain access to the shaft parts. Remove either the bearing cover (AU), or the mounting bracket (U), making it possible to then remove the shaft (K) and bearing (L). The stamped steel packing gland (M) and the special cork packing (N) can then be inspected. The cork packing should be renewed to prevent air leakage into the pump (or oil leakage out when the pump is not running). When replacing the gland make certain that its outside diameter bears on the outer ball bearing race, and its inside diameter against the cork shaft packing. All of this work may be accomplished without disturbing the head end of the pump. (The oil seal construction varies on larger pump models.)

## HEAD END VIEW OF PUMP WITH PUMP HEAD AND HEAD END BUSHING REMOVED

PUMP ASSEMBLED FOR  
RIGHT HAND ROTATION

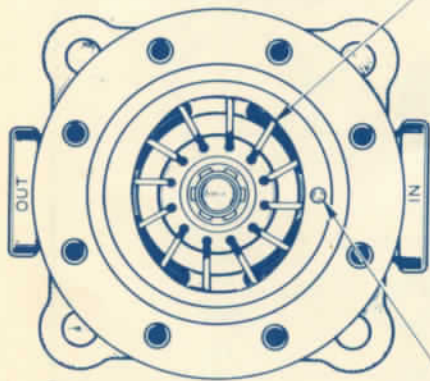


Fig. 7

VANES MUST BE ASSEMBLED SO THAT SMALL BEVELLED EDGES ARE TRAILING AS DETERMINED BY DIRECTION OF ROTATION.

NOTE: INLET AND OUTLET PORTS AS SHOWN (NOT INTERCHANGED) REGARDLESS OF DIRECTION OF SHAFT ROTATION.

PARTS USED FOR R. H. AND L. H. ROTATION ARE IDENTICAL.

LARGE END OF PIN EXTENDS INTO PUMP HEAD.

PUMP ASSEMBLED FOR  
LEFT HAND ROTATION

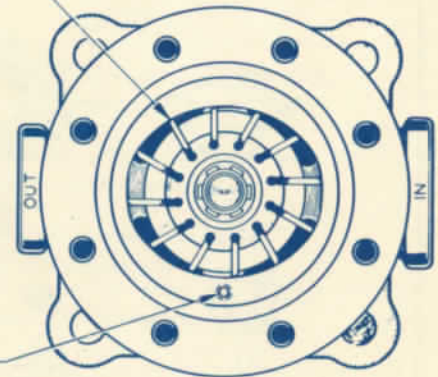


Fig. 8

SMALL END OF PIN EXTENDS INTO PUMP HEAD.

## CHANGING DIRECTION OF ROTATION

Considering the pumping cartridge as a complete assembly, it should be removed from the pump body, turned end-for-end and replaced in the body so that the protruding end of ring pin (P) fits into the corresponding size hole in the pump body. Ring pin holes are located 90° apart in pump body to accommodate assembly of

parts for either right-hand or left-hand rotation. Figs. 7 and 8 show position of cartridge for right-hand and left-hand rotation respectively. Follow procedure outlined above for reassembling pump head. **Model number and arrow on pump should be altered if changes are made from the original assembly.**

## PARTS

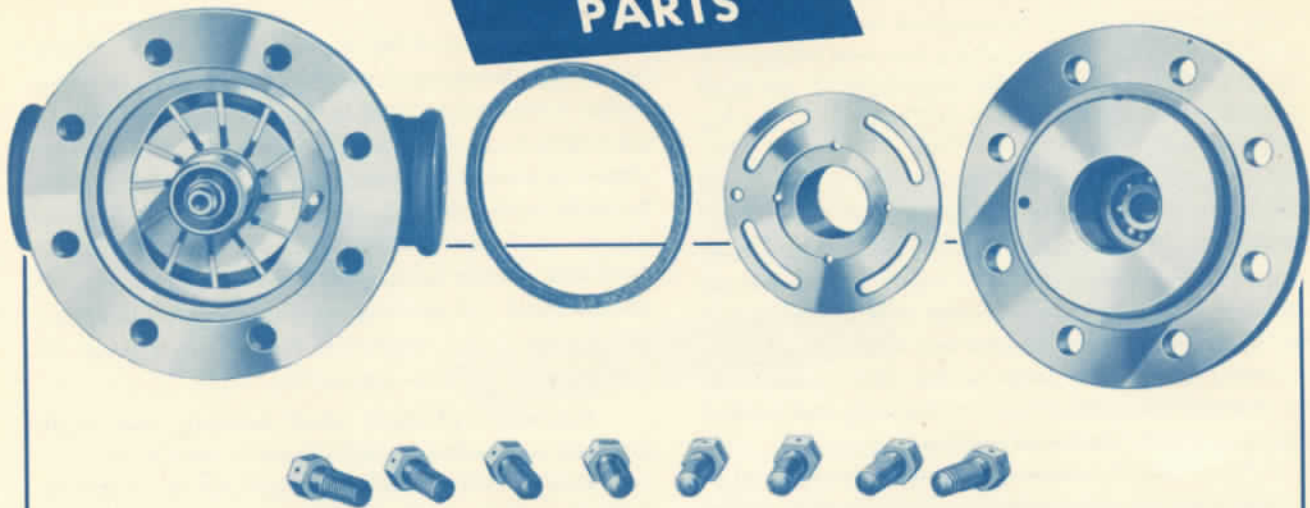
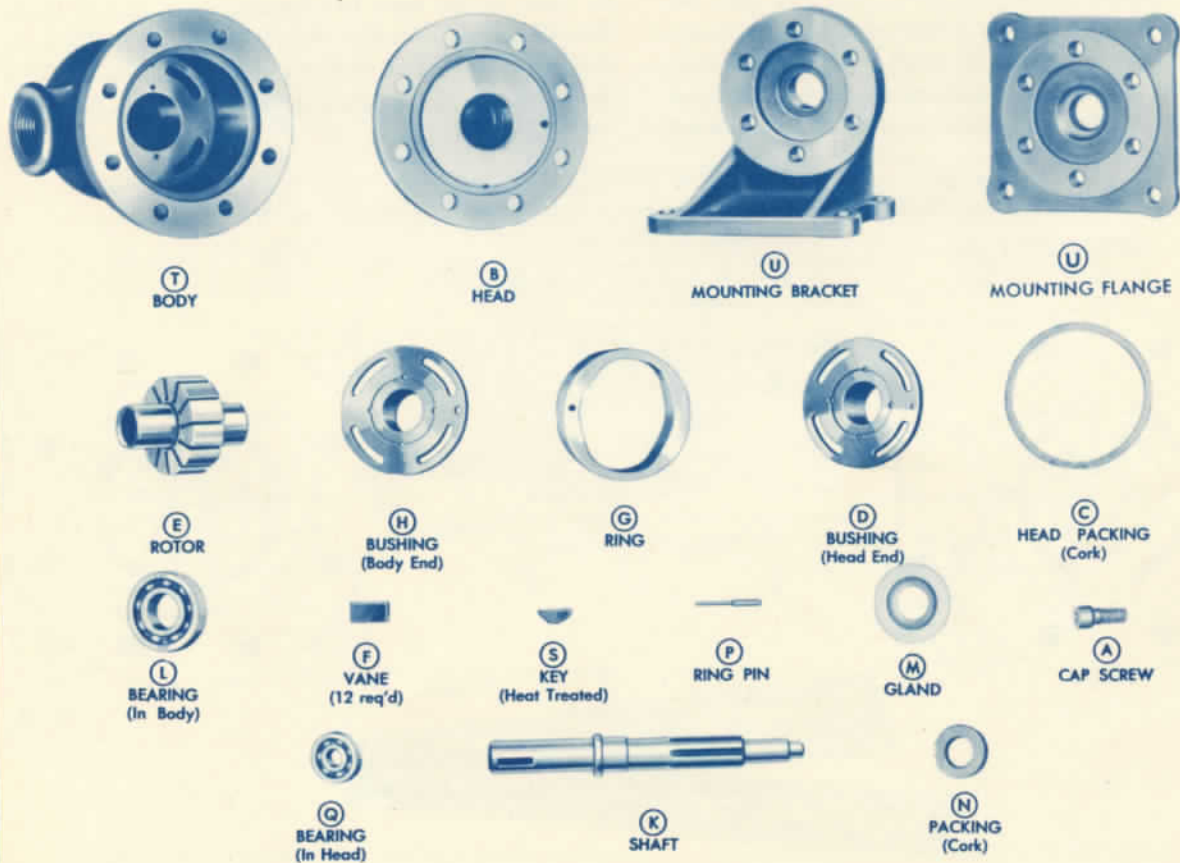


Fig. 9

Partial assembly viewing typical pump from head end. Assembly shown is for models designated as having right hand rotation which is clockwise when viewing pump from shaft end; counterclockwise when viewing pump as above.



In addition to the principal parts illustrated above, each pump model has other less important small parts which appear on service drawings. These sectional service drawings, carrying part numbers, are available for each series of pumps. The letter designations shown above correspond to parts numbers for various pumps as listed on parts drawings.

Fig. 10

## DIAGNOSIS OF IMPROPER OPERATION

The following chart lists the difficulties which may possibly be experienced with the pump and hydraulic system, and indicates the cause and remedy for each of the troubles listed. It should always be remembered that

"pressure" and "delivery" are factors which are usually dependent upon each other. Next to having adequate tools, it is probably most important to have adequate pressure gauge equipment when doing repair work.

TROUBLE	CAUSE	REMEDY
Pump not delivering oil.	Wrong direction of shaft rotation.	Must be reversed immediately to prevent seizure and breakage of parts due to lack of oil.
	Tank oil level low.	Add recommended oil, and check level on both sides of tank baffle to be certain pump suction line is submerged.
	Oil intake pipe or suction filter plugged.	Filters must be cleaned of lint soon after new oil is added, due to fact new oil contains considerable amount.
	Air leak in suction line.	Will prevent priming, or cause noise and irregular action of control circuit.
	Pump shaft turning too slowly to prime itself.	Check minimum speed recommendations in descriptive bulletin.
	Oil viscosity too heavy to pick up prime.	Thinner oil should be used, per recommendations for given temperature and service.
	Broken pump shaft or rotor.	Refer to preceding service data for replacement instructions.

TROUBLE	CAUSE	REMEDY
Pump not developing pressure.	Pump not delivering oil for any of the above reasons.	Check oil circulation by watching oil in tank, or removing plug in pressure line near pump.
	Relief valve setting not high enough.	Block machine travel, or oil circulation, and test with pressure gauge.
	Relief valve sticking open.	Remove dirt from valve seat. See relief valve instructions.
	Relief valve leaking.	Check seat for score mark and reseal.
	Leak in hydraulic control system (cylinders or valves).	Must be tested independently, by blocking off circuit progressively.
	Free recirculation of oil to tank being allowed through system.	Directional valve may be in open-center neutral, or other return line open unintentionally.
	Vane or vanes stuck in rotor slots.	Inspect for wedged chips or sticky oil, and reassemble per preceding instructions.
	Head too loose. (Very infrequent).	Must not be tightened too tightly—see instructions before using wrench on head screws.
	Broken core passages in pump body.	Replace body and check maximum relief valve setting immediately for shock overload condition.

**DIAGNOSIS OF IMPROPER OPERATION**  
CONTINUED FROM PRECEDING PAGE

TROUBLE	CAUSE	REMEDY
<b>Pump making noise.</b>	Partially clogged intake line, intake filter, or restricted intake pipe.	Pump must receive intake oil freely or cavitation takes place.
	Small air leak at pump intake piping joints.	Test by pouring oil on joints while listening for change in sound of operation. Tighten as required.
	Air leak at pump shaft packing.	Pour oil around shaft while listening for change in sound of operation. Refer to previous service instructions.
	Stuck pump vane.	Inspect for wedged chips or sticky oil, and reassemble per preceding instructions.
	Relief valve chattering.	Air being drawn into system at pump intake or pump shaft packing. (Check as above.)
	Pump head too loose, or a faulty head gasket.	Test by pouring oil over head, and replacing gasket per preceding instructions.
	Coupling misalignment.	Re-align and replace shaft packing per preceding instructions.
	Restriction pulled into intake cores (rag or paper).	Remove head and clean carefully after valve plate bushings are removed.
	Air bubbles in intake oil.	Check to be certain return lines are below oil level and well separated from intake line.
	Tank air vent plugged.	Must be open thru breather opening or air filter.
	Pump running too fast.	Check recommended maximum speeds from descriptive bulletin.
	Too high oil viscosity.	Use recommended oils of 150 to 225 SSU at 100° F. with normal air temperatures.
	Filter too small.	Capacity may be adequate only when just cleaned, and should have added capacity.

TROUBLE	CAUSE	REMEDY
<b>External leakage around pump.</b>	Shaft packing worn.	Replace shaft packing per preceding instructions.
	Head of oil on suction pipe connection.	Sometimes necessary, but will usually cause slight leakage.
	Foot valve in suction line.	Should not be used.
	Damaged head packing.	Replace head packing per preceding instructions.

Repair service for Vickers pumps is maintained at the Detroit plant; return pumps there for complete overhaul. Due to the "cartridge" construction, the equivalent

of a new pump ordinarily can be given on a repair job at a very economical figure. Pumps are tested at actual maximum operating conditions before reshipment.

**VICKERS Incorporated**

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