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Consumers Power Company

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • Area Code 517 788-0550

September 27, 1976

Director of Nuclear Reactor Regulation
Att: Mr Albert Schwencer, Chief
Operating Reactor Branch No 1
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-255, LICENSE DPR-20 -
PALISADES PLANT - CONTAINMENT
AIR LOCK TESTING

On July 30, 1976 representatives of Consumers Power Company met with members of your staff to discuss our request for an exemption from the regulation in Appendix J which requires that air locks be tested after each opening.

At the meeting, it appeared that a major staff concern related to possible inadvertent damage of the door sealing gaskets which could result in undetected loss in door seal integrity for a long period of time. This damage could occur during passage of personnel and equipment through the lock.

The following discussion formalizes the information presented at the July 30, 1976 meeting and represents some additional consideration related to the question of door seal reliability. As discussed in the July meeting, complete documentation of air lock leakage problems, which have occurred within the industry, has not been available to us and we would like to review this data as soon as your staff is able to make it available.

The Palisades Plant first went critical in April of 1971 with about five and one-half years of operating experience occurring since that time. A review of our maintenance and inspection records shows that no damage to the rubber seals or stainless steel sealing surfaces has occurred. The original gaskets are still in use and performing satisfactorily.

Figure 1 is a general drawing of a personnel air lock manufactured by the W J Wooley Company. It is designed to contain a pressure of 55 psig, though it has been tested to 63 psig, and it encloses 869 ft^3. In the upper right-hand corner is a detailed drawing showing the seating surfaces. It should be noted there are two gaskets (each of 45 dirometer hardness) per door, while only one gasket is needed to seal the penetration. Since there are two doors, four seals exist between the containment and the outside, any one of which would provide the necessary integrity. The rubber gaskets in their seats are below the shoulders of the gasket frame. This protection undoubtedly partially explains why none of the gaskets have been damaged.

There is a 1/8" pipe tap between the gaskets on each door so each door can be manually tested to verify both seals are holding. These were used when the doors were first installed and the one time it was necessary to adjust (shim) the rubber gaskets for a tighter seal.

Figure 2 is a picture of the outside of the auxiliary building door of the Palisades air lock whereas Figure 3 is a picture of the inside of the same door. The remaining pictures are close-ups of the "2 o'clock" and the "10 o'clock" regions.

Figure 4 is at the "2 o'clock" location. The dark area adjacent to the door is the edge of the gasket. Figure 5 is also the "2 o'clock" location with the door open. The rubber seals and the frame are plainly seen. Finally, Figure 6 is a picture of the "10 o'clock" location with the door open. The stainless steel lips on the doors are clearly visible as are the mating rubber gaskets.

Since this air lock is part of the containment isolation system, the present Technical Specifications require that the air lock be tested at rated pressure (55 psig) every six months (provided containment isolation was necessary during that period). Though no specific maximum leakage limit exists for the personnel air lock, the plant is restricted to 60,000 cc/min total leakage for all containment penetrations. The results of the personnel air lock leakage tests are shown in Table 1. The leakage is generally less than 7% of our total allowable leakage. In one instance (August 1974), a leak in the air lock was found. This leak was corrected by placing a shim under the gasket at that location. No other changes have been necessary in over five years. The original gaskets are still in place.

Since Palisades first went critical, it has been beset by an abnormal amount of equipment problems. This has resulted in maintenance activities that are estimated to be two to three times more than normal. Further, much of this maintenance involved steam generator repairs, primary access to which is via the personnel air lock. During the last outage, approximately 80 people per day passed through this air lock.

While damage to the door sealing surfaces might be contemplated as a result of this type of activity, the fact still remains that no damage has occurred to <u>any one</u> of the four sealing surfaces in what would be 10 to 15 years of exposure in most plants. At Palisades, the location of the air lock may have served to protect the sealing surface. Both doors to the air lock are protected, each entering essentially into a protected chamber. Both are covered from above and on at least two sides so large or heavy equipment is not readily taken through the air lock.

If a system were permanently installed to permit either automatic or manual testing of the door sealing surfaces (through pressurizing between the gaskets), it would not only be an added expense and additional maintenance requirement but would also raise questions relating to reducing containment integrity. The addition of testing equipment would add possible leakage paths and dependence on the integrity of added valves and controller. We conclude that this loss in integrity would tend to offset any gains that might be made. This is especially true in light of the continuing good experience we have had with the sealing surfaces of the air locks.

A current review of our present air lock testing procedures shows that the standard full pressure test of the lock (normally made every 6 months and at 55 psig) would not necessarily assure the integrity of both sealing surfaces on each door. To add additional assurance of the sealing surface integrity, the standard 6-month test will include a between seal leak test, or some other equivalent method, to demonstrate the integrity of both seals.

In addition to the experience observed at our Palisades Plant we have also reviewed our maintenance records for our Big Rock Point facility. This review covers records from 1963 to the present time.

Big Rock Point has three air locks which utilize single gaskets on each door. These gaskets and the sealing surface are arranged very similar to that discussed for our Palisades Plant. Two of the air locks are used extensively for passage of personnel and equipment. The personnel lock is operated 24 times per day for operator surveillance alone with many additional operations occurring to permit maintenance activities, etc.

The results of the Big Rock Point personnel and equipment air lock leakage tests are shown in Table 2. Both of these locks experience considerable use. The equipment lock is generally used to pass both small and large pieces of equipment including items such as fuel shipping casks. This lock is accessed by overhead cranes on both sides (with a track and dolly providing passage through the lock). No mechanical type damage to either of the sealing surfaces is known to have occurred since operation began in 1962.

The records disclosed that corrective maintenance involving the door seal has been required on only a few occasions. These activities were performed to prevent[1] leakage from becoming acceptably high and none were the result of gasket damage.

We conclude that the operating experience at our Big Rock facility gives further support and justification to our request for an exemption from testing of air locks (within 72 hours of use).

[1] Plant records for October of 1963 show an apparently unacceptable leakage rate for the escape lock. The cause of this leakage is not known but since the lock is seldom used and we have no record of gasket replacement, it is considered unlikely that it was related to gasket damage.

The maintenance records were also unable to account for one personnel lock gasket. While we cannot determine the reasons for the use of this gasket, discussion with various staff members disclosed no gasket problems that were related to inadvertent gasket damage.

This information has been provided for your consideration regarding our exemption request. We are confident that sufficient basis exists to demonstrate that this exemption will not endanger life or property and is in the public interest.

David A. Bixel

David A. Bixel
Assistant Nuclear Licensing Administrator

CC: JGKeppler, USNRC

TABLE 1

Palisades Nuclear Plant

The following is a list of the results of all known Local Leak Tests conducted by Consumers Power Company on the Palisades Plant personnel air lock. The Technical Specifications limit for all penetrations is approximately 60,000 cc/min.

Testing Period Date	Leakage Results (cc/Min)
March 1971	1085
October - November 1971	5171
April - May 1972	3243
October - November 1972	4190
January - March 1973	3037
April - June 1973	4030
November 1973 - April 1974	4520.0
December 1974 - January 1975	6076.9
July - August 1975	2631.4
January - April 1976	4021.0

In August of 1974 a Leak Test was performed between the seals on the air lock inner door. This test was performed to identify a postulated seal leakage on the inner door. A leak was identified, the seal shimmed, and an after maintenance leakage of 62.7 cc/min resulted from the "between the seal" test.

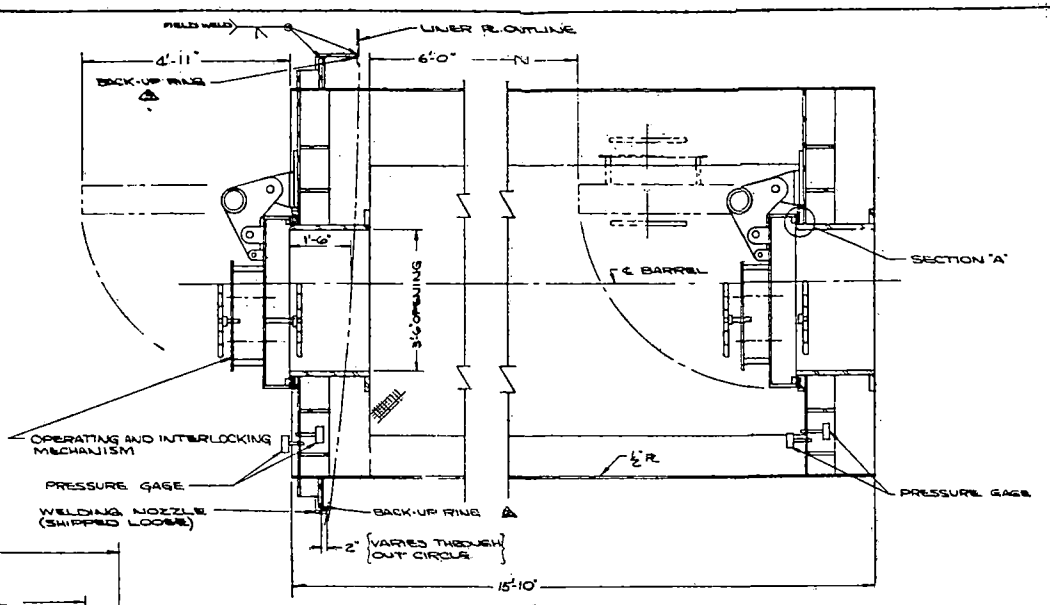
TABLE 2

Big Rock Point Nuclear Plant
Leakage Rates in Pounds/24 Hours

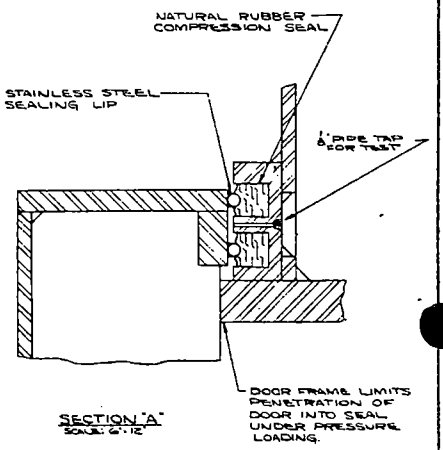
The Technical Specifications limit for all penetrations is approximately 410 pounds/24 hours.

Date	Equipment Lock	Personnel Lock
4/ 4/63	11.7	261
9/22/63	32.404	52.56
10/10/63	0	11.632
2/12/64	23.608	25.091
2/22/64	31.764	3.895
8/20/64	24.62	10.342
8/21/64	16.58	10.14
2/ 9/65	12.80	23.78
8/24/65	87.467	0.7997
2/ 5/66	0.0	2.3
8/13/66	16.0	1.34
2/21/67	48.55	17.55
8/18/67	0.0	7.9
3/ 4/68	0.0	0.0
9/ 9/68	0.0	34.2
4/ 2/69	32.30	7.73
10/14/69	61.6	6.75
4/14/70	1.44	6.08
10/11/70	70.865	1.44
4/14/71	121.29	6.95
10/11/71	133.11	0.0
3/ 7/72	42.52	3.38
11/ 6/72	26.40	4.95
4/25/73	32.9	8.5
10/ 8/73	27.66	4.83
3/22/74	18.84	4.84
9/30/74	13.9	6.7
3/22/75	31.74	52.07
3/27/75	8.69	17.42
4/27/75	8.74	17.42
9/22/75	20.55	4.9
4/21/76	12.63	1.7

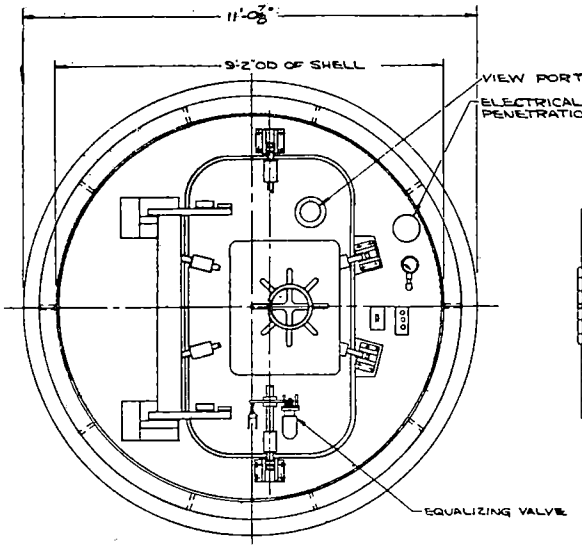
Figure 1



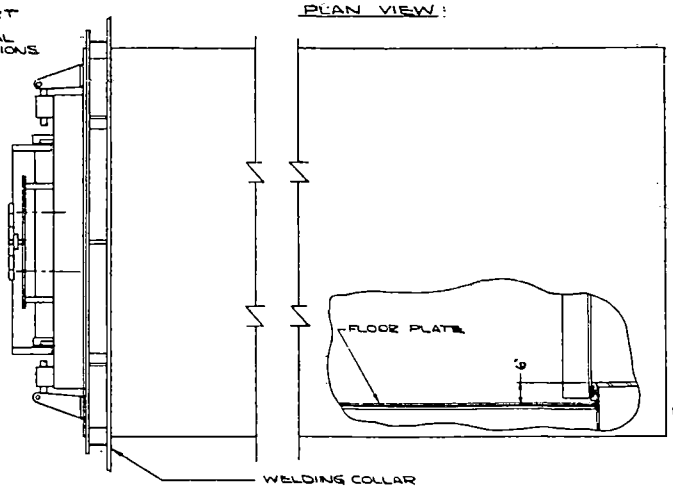
PLAN VIEW



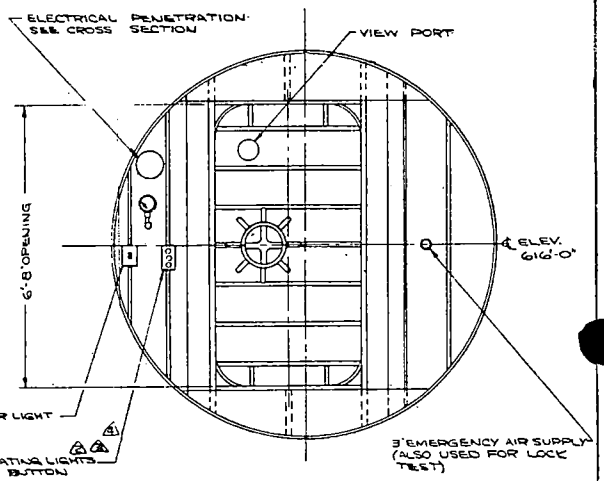
SECTION "A"
SCALE: 3"-1'2"



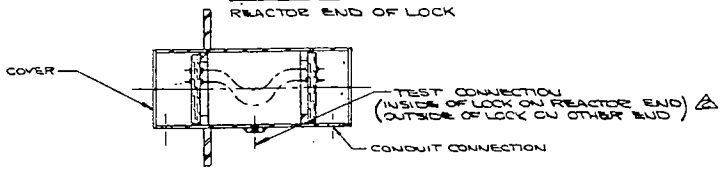
END VIEW
REACTOR END OF LOCK



ELEVATION



END VIEW
OUTSIDE END OF LOCK



ELECTRICAL PENETRATIONS

REVISIONS		
REV 4	ADD INDICATION LIGHT	10-16-67 CLC
REV 3	CHANGE SIZE OF ELECTRICAL BOX AND ITS LOCATION	10-6-67 CLC
REV 2	REVISED PER CUST.	6-19-67 CLC
REV 1	GEN REVISION	3-30-67 CLC

LOCK DESIGN PRESSURE IS 55 PSIG
LOCK STRUCTURAL TEST PRESSURE IS 63 PSIG

PALISADES PLANT
CONSUMERS POWER CO.
P.O. Nº 5935-C-53

W. J. WOOLLEY CO.
240 LATHROP AVENUE RIVER FOREST, ILLINOIS

SCALE: 3/4"=1'	DRAWN BY: C.L.C.
DATE: 12-28-67	APPROVED: W. J. Woolley
	APPROVED

GENERAL ARRANGEMENT
PERSONNEL AIR LOCK -

SHOP ORDER Nº LD 316 — DRAWING NUMBER 30041

FIGURE 2

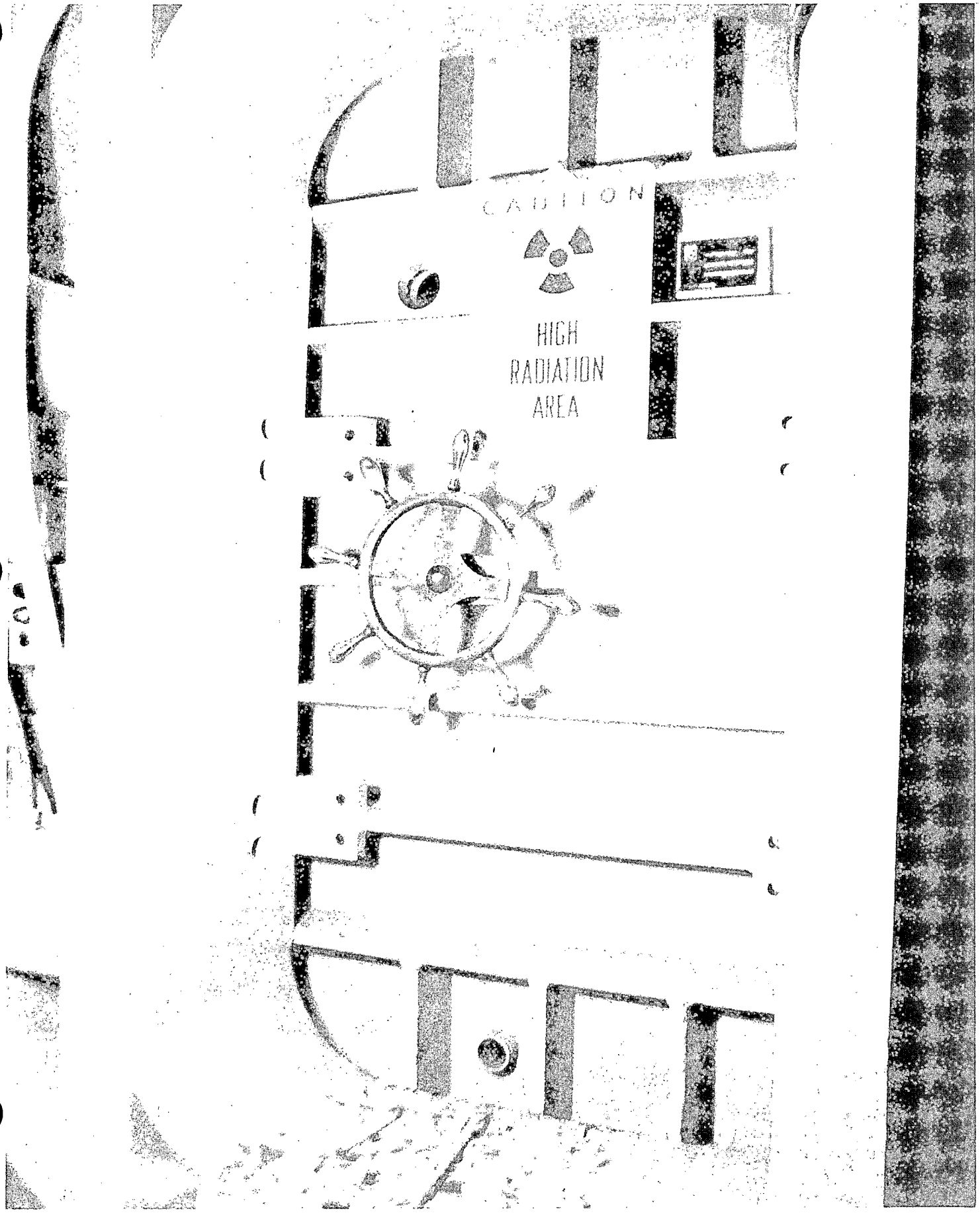


FIGURE 3

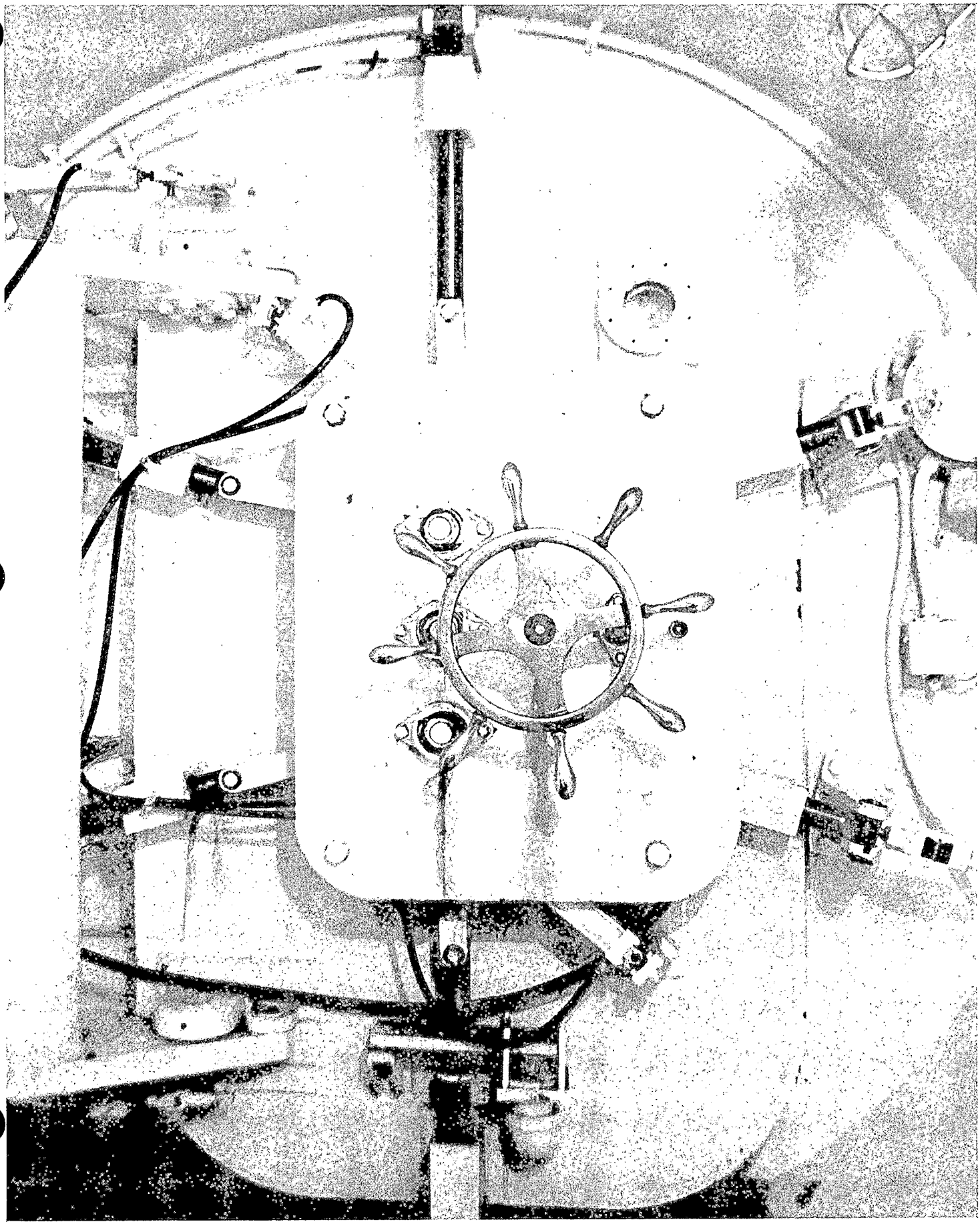


FIGURE 4

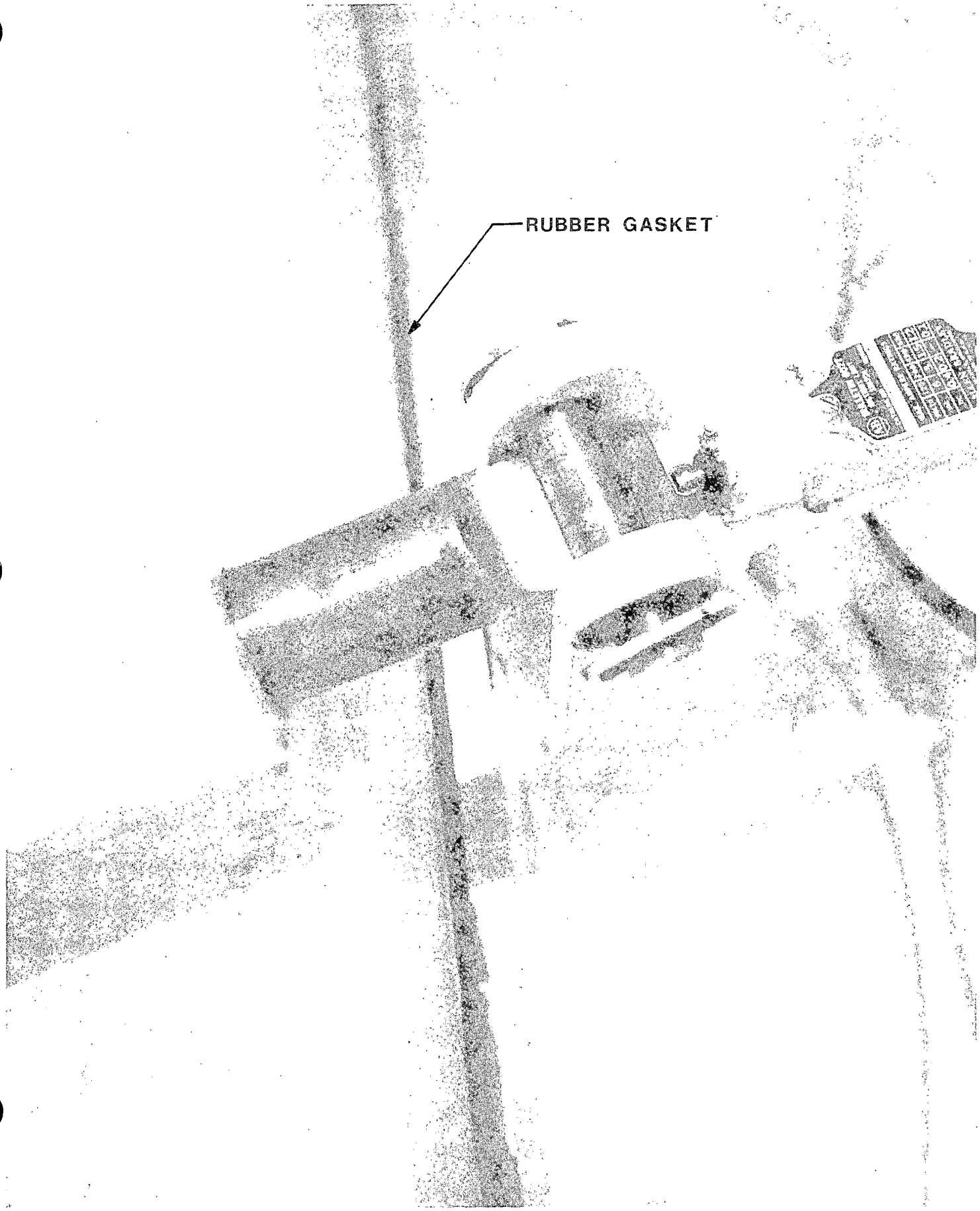


FIGURE 5

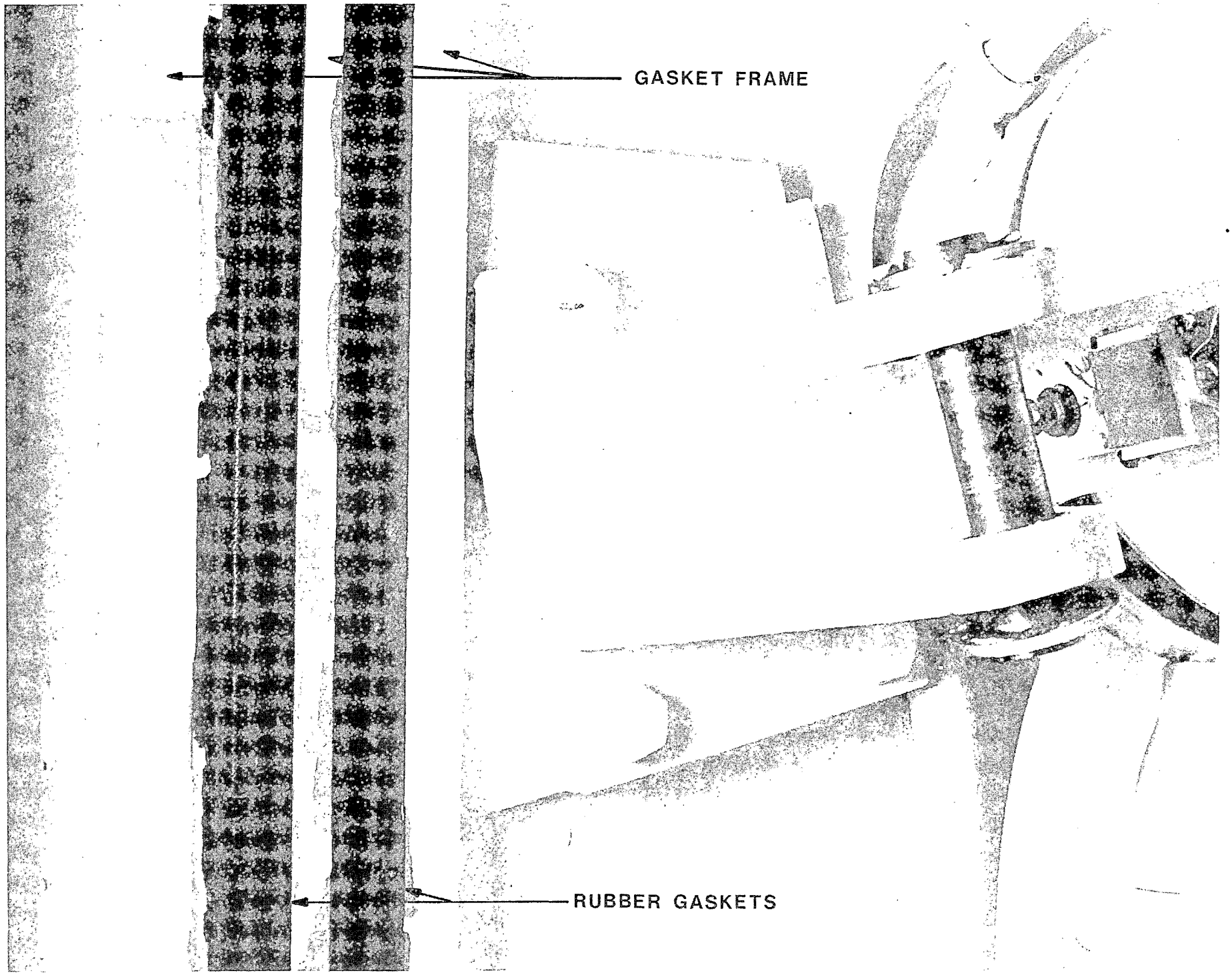


FIGURE 6