BALANCE PISTON MICROMETER

The balance piston (or dummy) micrometer shown in Figure 1 is mounted on the high pressure end of the cylinder cover for the purpose of determining the position of the rotor balance piston relative to the cylinder.

A sectional view of this mechanism is shown in Figure 1. Its principal parts are: the spindle "7" with spindle head "2" attached, index wheel "4" which is graduated to read movement in thousandths of an inch, the spring "5", and the spacer "1". As shown in Figure 1, the spindle "7" is cut away at the end leaving only a half-section. With the spindle turned as shown in the Figure it rests against the turbine rotor and when turned 180° it rests against the cylinder seal ring. When measurements are being taken the spring "5" being under compression, holds the spindle "7" in its innermost position until it rests against the rotor or until the head "2" rests against the index wheel "4". It will thus be seen that rotating the index wheel "4", which is threaded in the support "3", moves the spindle "7" inward or outward depending on the direction of rotation.

When taking readings of the cylinder position, the spacer "1" is placed between the head and the index wheel to facilitate handling. It is of utmost importance to take the cylinder reading first and then that of the rotor.

To obtain a reading of the balance piston position with this indicator, proceed as follows:

1. With the micrometer spindle "7" in the position with the mark "Dummy" in line with the centerline scribed on the support, advance the index wheel "4" slowly until the spacer "1" is just free. Record the micrometer reading.

   This setting should be made very accurately because it will be noted that if the index wheel "4" is advanced too far the micrometer spindle "7" will rest against the cylinder ring and there will be a clearance between the index wheel "4" and the spacer "1" (or spindle head "2") and the reading will not be correct. Therefore the index wheel "4" must be adjusted carefully so that there is no clearance between it and the spacer (or spindle head), but at the same time so that it takes no strain on the spindle head (or spacer).

2. Pull out the micrometer spindle "7" and turn it 180°. Remove spacer "1" allowing the spindle "7" to move inward until the spindle head "2" rests against the index wheel "4". Advance the index wheel "4" slowly until a very light contact with the turbine rotor is felt. Record the micrometer reading.

3. After taking the readings pull out the micrometer spindle and turn it 180° to the "Dummy" position. Then turn the index wheel a complete turn counterclockwise and insert the spacer between the index wheel and the spindle head.

An example will best explain how these readings show the movement of the balance piston with relation to the turbine rotor.

The following readings are a good example:

Reading #	*Main Rotor Micrometer	Balance Piston Micrometer		
		Cylinder	Rotor	Difference
1	3.250	.800	1.400	.600
2	3.200	.790	1.350	.560

*Reading taken at end of rotor shaft.

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Assume that No. 1 reading was taken with the turbine cold and No. 2 reading was taken after the turbine had been in operation a short time. It can then be seen from the main rotor micrometer reading that the turbine rotor has moved .050 inch toward the inlet end during the interval between readings while the balance piston has moved .600 - .560 or .040 inch in the same direction during this same time. Taking the difference between the rotor end movement of .050 and the balance piston movement of .040 we see that the clearance indicated by the balance piston micrometer is .010 inch greater than that indacated by the main motor micrometer which is the difference in expansion at the two locations.

The following list has been compiled to facilitate ordering spare or renewal parts by item number and name together with the serial number of the turbine.

Item No.	Name
1	Spacer
2	Spindle Head
3	Support
4	Index Wheel
5	Spring
6	Dowel Stud
7	Spindle
8	Stud
9	Gland
10	Packing

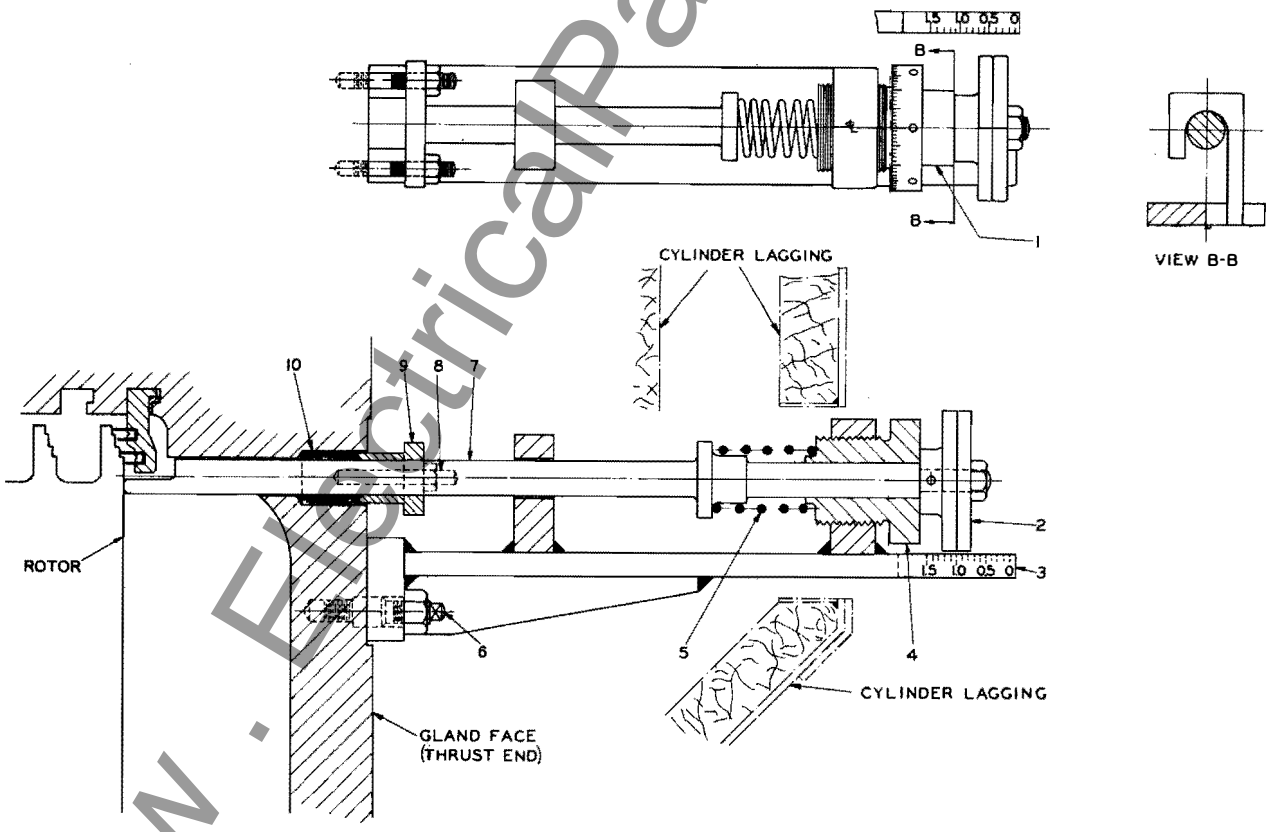

Figure 1

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