DEPARTMENT OF CONSUMER AND CORPORATE AFFAIRS

CANADA

STANDARDS BRANCH

G-41

OTTAWA, January 2, 1969

NOTICE OF APPROVAL

FOR

ROCKWELL TEMCORECTOR TYPE T

This approval to be superseded by an amended Circular not later than January 1, 1970 (see note below)

Apparatus

Static pressure ranges	0-10, 0-20, 0-50, 0-100, 0-200 0-500 and 0-1200 psig
Temperature range	-20°F to + 130°F
Temperature measuring system	Case compensated with 6 foot length armoured capillary
Volume registers	6-digit cyclometer-type counters or 6-dial clock type registers *
Volume cycling	1,000 or 10,000 cu. ft. per cycle
Proving circle capacity	10,100 or 1,000 cu. ft. per rev.
Chart rotation	Counter-clockwise, 24 hours or 7 days per revolution

* The information on these registers is contained in the approval circular G-22-1, re-issued August 14, 1968.

The computation of the volume of a gas, at the contract temperature and pressure, which has been registered in cubic feet at line conditions is based on the ideal gas laws modified by a deviation factor available to us in the form of a Supercompressibility factor (Fpv), determined according to the A.G.A. Gas Measurement Committee Report No. 3, Orifice Metering of Natural Gas.

The general equation for converting the meter readings at line conditions to a contract base pressure and temperature is

$$Qs = Qd\ Pm\ Tm\ (Fpv)^2$$

Qs = Quantity of gas at the contract base pressure and temperature, cu. ft.

Qd = Actual (displaced) gas passed at existing meter conditions, cu. ft.

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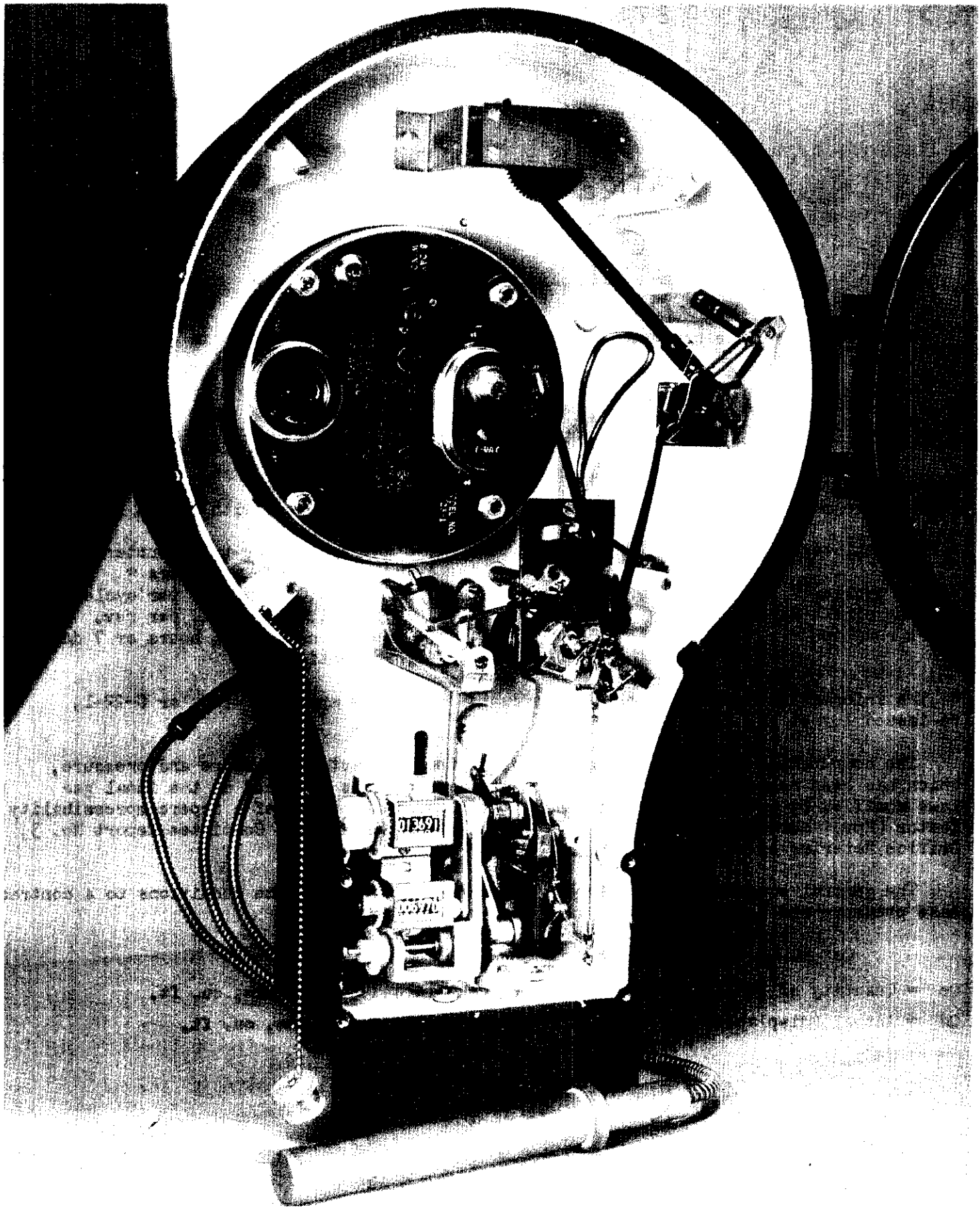

Pm = Pressure multiplier

$$= \frac{\text{Weighted average existing gauge pressure + barometric pressure}}{\text{absolute pressure base}}$$

Tm = Temperature multiplier

$$= \frac{\text{Temperature base + 460}}{\text{Weighted average flowing gas temperature + 460}}$$

Fpv = Supercompressibility factor based upon the weighted average gas pressure and temperature and the normal composition of the gas. The composition is represented by its specific gravity, its content of nitrogen and carbon dioxide and its calorific value as used in the derivation of Fpv values.

The Temcorector Type T is designed to sense and record on a circular chart the line pressure and flowing temperature of the gas, and automatically and continuously apply the momentary pressure and temperature multipliers thus eliminating the need for weighted multipliers. This function is achieved through the employment of a cam type integrator which combines the corrective effects for pressure and temperature variations.

The device is driven directly from the meter to which it is attached in place of a standard register. The Temcorector Type T does not make automatic correction for the Fpv factor.

The instrument consists of the following main components:

1. Pressure measuring system which positions the integrating cam and through a linkage connects to the pressure recording pen.

2. Temperature measuring system which controls the position of the pivot point of the integrating knife and through a linkage connects to the temperature recording pen.

3. Uncorrected volume register which through suitable gearing connects directly to the meter output shaft and indicates the volume passed through the meter at line conditions of temperature and pressure.

4. Integrated volume register which is linked up with the cam integrator and provides the indication of the volume passed through the meter at declared base conditions.

5. Volume recording pen which, through suitable gearing and shaft assembly connects to the meter output shaft and records volume increments on the outer edge of the chart.

In operation the pressure element positions a suitably shaped integrating cam to effect the required volume correction from line to base pressure conditions. At the same time the temperature system controls the position of the pivot point of the integrating knife which strikes the cam. The effective angle through which the knife travels is thus dependent on (a) the position of the cam, and (b) the position of the pivot point, i.e. pressure multiplier and temperature multiplier.

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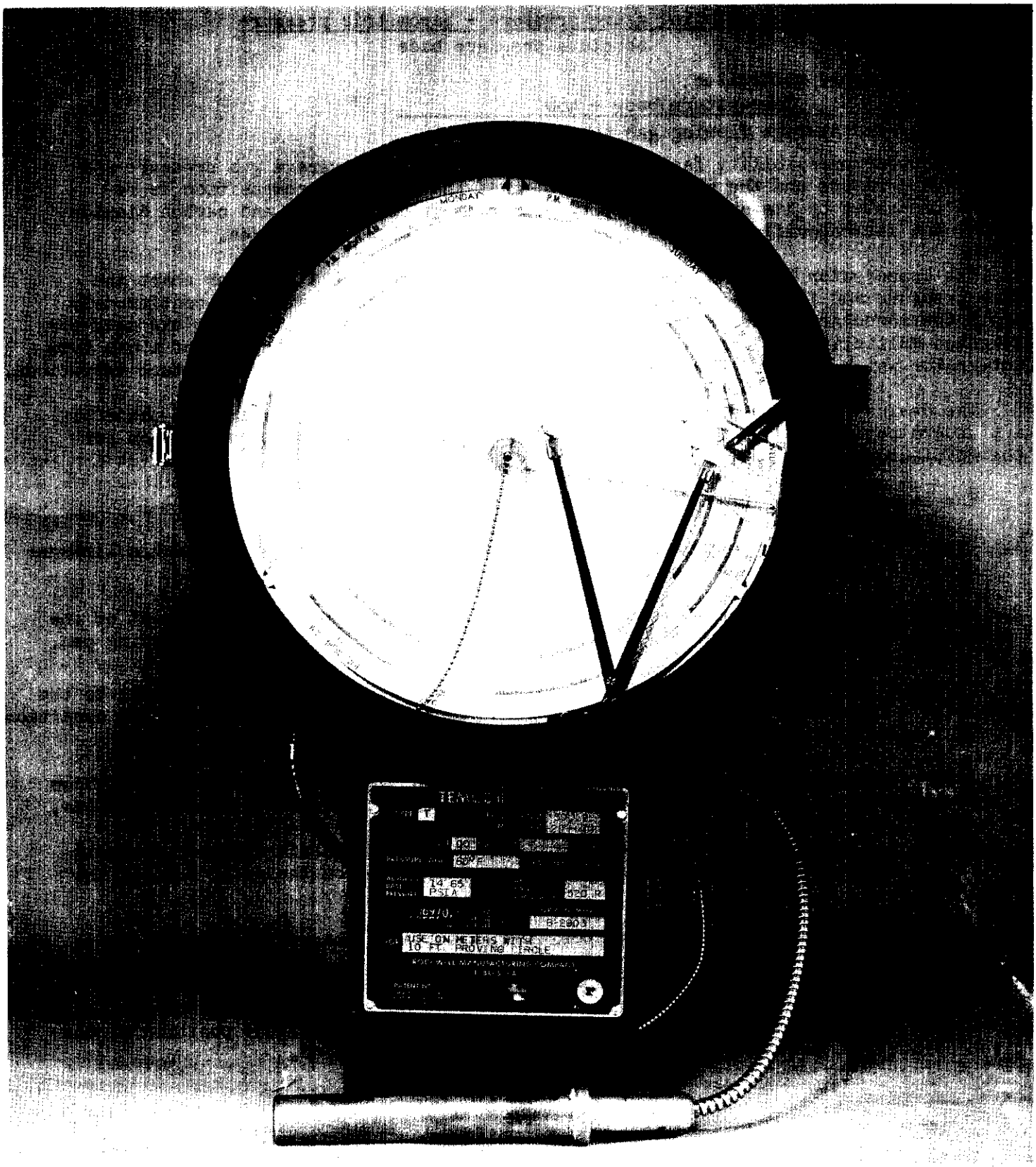

The angle through which the knife travels determines the advance of the integrated volume register, and for properly calibrated integrator, the registered volume is always at base conditions. The oscillating action of the integrating knife is obtained from a crank arrangement driven by the proving circle gear.

The device is equipped with two test dials each subdivided into 100 increments. One test dial, referred to as the "proving circle" is driven directly from the meter output shaft, while the other, driven by the integrated volume register is referred to by the maker as the "interpolator wheel". The capacity per revolution of the proving circle, in cubic feet, is marked on the nameplate and it is usually 1/10 of the capacity of the lowest digit of the uncorrected register. The capacity per revolution of the interpolator wheel is always 1/10 of the capacity of the lowest digit of the integrated volume register. The capacity of the last digit of both registers is marked on the nameplate by an appropriate number of zeros following the lowest digit.

The Temcorectors Type T may be used with any approved diaphragm or rotary type meter manufactured by Rockwell Manufacturing Co. Ltd.

The selection of a weighted average Fpv factor for use on the corrected index reading must be based on a record of the flowing volumes, temperatures and pressures. If no continuous record is available and an Fpv is selected, (other than a factor of one), the variations in pressure and temperature normally existing at the meter must be such as to create no more than a $\pm$ 0.5% error in the $(Fpv)^2$ used.

It is recommended that this Temcorector Type T be operated only at ambient temperatures above freezing.

Each instrument shall have a nameplate containing the following information:

> Manufacturer's name, Instrument's type designation, Pressure range, Temperature range, Base pressure, Base temperature, Serial number and the capacity of proving circle.

NOTE: It should be particularly noted that the manufacturer has under development at the present time certain modifications to this device which are expected to improve its overall performance. When these modifications receive approval from the Standards Branch this present Circular will be amended and re-issued. Since the manufacturer wishes to provide to current purchasers of the device such benefits as may accrue from the modifications all such devices in operation in the field under this approval will be modified to conform to the amended approval. In order to keep the number of devices requiring change within reasonable bounds it has been mutually agreed that after January 1, 1970, only devices conforming to the proposed Amended Approval will be permitted to be sold or remain in service.

Approval granted to: Rockwell Manufacturing Company of Canada Limited,
Guelph,
Ontario.

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