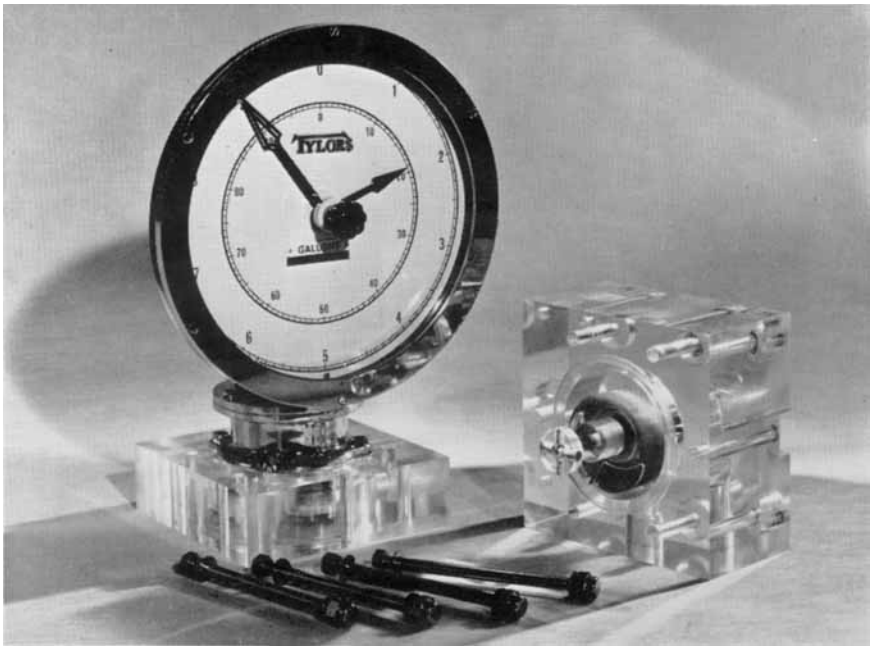
# Corrosion Resistant Cobalt-Platinum Alloy Magnets

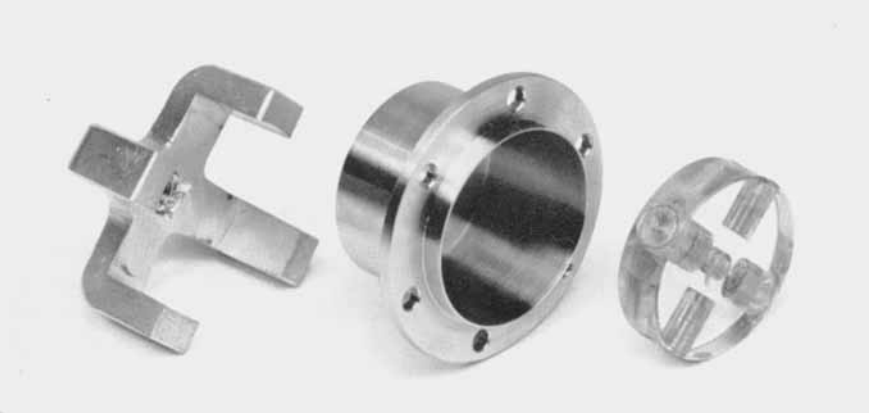
## METER DESIGNED TO HANDLE CORROSIVE LIQUIDS

In applications where powerful permanent magnets are called upon to resist prolonged chemical attack Platinax II offers many advantages. The composition of Platinax II is closely controlled to give an equi-atomic alloy, corresponding to 23.3 per cent cobalt and 76.7 per cent platinum by weight. This high platinum content makes the alloy virtually immune to attack by such chemicals as concentrated sulphuric and nitric acids, acetic anhydride, 50 per cent hydrochloric acid, 50 per cent hydrofluoric acid, strong caustic alkali solutions, sodium hypochlorite and calcium hypochlorite. After a special heat treatment which brings about partial ordering of the structure Platinax II can be magnetised to give permanent magnets of outstanding strength.

Because of this unique combination of high magnetic strength, even in magnets of small size, with high chemical resistance, Platinax II magnets were chosen for use in a new meter manufactured by Tylors of London Ltd., of Burgess Hill, Sussex, designed specifically to meet the needs of the chemical industry in measuring and controlling accurately the flow of highly corrosive liquids. The meter operates on the rotary piston principle, the body being constructed of perspex and all other internal parts which come in contact with the liquid being manufactured from material having complete resistance to corrosive attack.




*Dismantled view of the meter by Tylors of London Ltd., for handling corrosive liquids such as hydrochloric acid and hypochlorites. Platinax II cobalt-platinum magnets are used in the drive mechanism.*



*Component parts of the magnet drive showing the four-pole cobalt-steel claw magnet, the tantalum separating cup and the Platinax II magnet assembly containing four magnets backed by pieces of soft iron to increase their effective length.*

A four-pole Platinax II magnet assembly which is exposed to the corrosive liquid operates in combination with an outer four-pole cobalt steel claw magnet to provide a glandless drive between the piston and the dial mechanism. A tantalum cup separates the two halves of the drive, resulting in a fairly large air gap between the pairs of poles. This makes essential for the smaller inner magnet the use of a highly powerful non-corrosive magnet material of high coercivity to ensure that the coupling between the piston and the dial mechanism is sufficiently powerful to operate without the occurrence of any slipping.

R. A. M.

# Ceramic Thermoelectric Generator

## PLATINUM AND NICKEL OXIDE JUNCTIONS

A ceramic thermoelectric generator, developed by the Minneapolis-Honeywell Regulator Company for the United States Army, is capable of an output of 100 volts at temperatures of around 1300°C.

The unit, illustrated here, consists of a pack of fourteen alumina plates, the continuous series of junctions being formed from platinum—produced by firing on a platinum paste—and a sprayed coating of lithium-doped nickel oxide. The cold junctions are developed by heat losses due to conduction and radiation. The platinum metallising paste is also used to connect the plates together, the pack then being assembled with ceramic nuts and bolts.

The unit is now being tested by the United States Army, utilising waste heat such as exhaust gases from rocket engines and from re-entry nose cone heating.