pany to which Professor Stauber added a rotating water sealing ring within the working chamber, thereby creating the hybrid water-ring-pump of the Siemens Company. Despite considerable efforts by Professor Stauber and the Voith Company (Germany) it proved impossible to apply the principles to a heat-engine or a large gas-engine. Combustion turbulence tore up the water-ring surface and it proved impossible to effect complete sealing. Hence, the multi-cylinder experimental engine suffered from leakages, but even if these problems had been overcome the particular design would have been condemned by the inherent shortcomings of all PROM-configurations.

7.10 Mixed engagement (meshing) methods derived from the principles of lines VI-XII of the classification charts

Engagement methods shown in lines VI–XII (charts 7–10) are already mixed methods derived from the methods shown in lines I–V; it is obviously possible to obtain further mixed methods from the principles shown in lines VI–XII. For example, the Rotasko-compressor of the Escher-Wyss Company represents a single rotation type rotating piston machine whose engagement principles correspond to those of chart 9 SROM VI/11 and SROM XI/9. Its sealing component is housed in a parallel sided slot which is not, however, directly within the enveloping casing but in a cylindrical trunnion block which has a certain amount of rotational freedom. To be precise, control levers project sideways from the sealing component and are linked to the shaft of the rotor. This arrangement ensures that the sealing component is always radial whatever position the rotor is in.

8. Machines with rolling piston rotors

Table 27 is not a model sheet but a visual comparison of PLM- and PROM-type machines whose power transmitting parts are rolling pistons, which are rather conspicuous components. At first it seems that every configuration which is to be classified should be considered as a special case. However, four fundamental and differing principles seem to apply to the designs. The rolling piston is common to all but it is merely a detail of some of the groups without being an essential feature of these configurations.

In another group the rolling piston arrangement clearly determines the engagement method and the relative position of the particular design in the classification tables. The varying significances of particular features complicate the issue and further classification is, therefore, essential.

The rolling piston and the inner housing bore of the first planetary-rotation machine chart 8 (PLM) III/5 shown, may be smooth or it may feature suitable meshing gear teeth without altering the basis of the design. Furthermore, all variations between rolling of a smooth circular piston and rolling of external teeth of the piston engaging with the internal teeth of the bore are possible. Even part smooth rolling and part rolling in the manner of meshing gears is possible. In the absence of rolling pistons some of the machines in table 27 become single-rotation or related units; in these cases the rotors are eccentrically mounted on the main shafts which are free to revolve in fixed bearings. Consequently, machines of chart 10 (PROM) VI/6 and (PROM)VI/13 of table 27, 3rd line, become the chart 9 (SROM) VI/4 and (SROM) VI/11 machines shown in table 9. Similarly the machines designated (PROM) XI/6 and (PROM) XI/13 of table 27, 4th line, become the units (SROM) XI/4 and (SROM) XI/11 of table 9. The same applies to the designs of chart 8 (PLM) V/13 and (PLM) XI/15 table 27, 3rd column, which become single-rotation machines, that is designs similar to those which can be completely balanced. For this category of machines the rolling piston acquires merely the circular-piston shape, produced by modification of the respective single-rotation rotor.

In contrast to the above models, the development of the power-transmitting part into a rolling piston, indicated in line 2 of table 27, necessitates a modification of the designation PROM VI to PROM VI ± III.

By giving the sliding piston of a chart 10 (PROM)-VI design a concave end face instead of a convex one, so that a needle-type sealing element may be inserted, the first step has been taken towards the rolling-piston principle. A sealing element which hardly projects beyond the sliding piston contour transmits so little power that it cannot be considered a power transmitting part.

In contrast to the above, the development of power-transmitting components into rolling pistons, indicated in line 2 of table 27, necessitates a new designation; thus, chart 10 (PROM) VI becomes (PROM) VI ± III.

When the sliding piston of a (PROM) VI machine is given a concave (partly cylindrical) slot in place of a convex running surface so that it can accommodate a needle type sealing element, which is free to rotate about its longitudinal axis, the embryo of a rolling piston has thereby been created. A sealing element which barely projects beyond the sliding piston contours cannot be responsible for more than a fraction of the power transmitted and must not be confused, therefore, with the piston itself. When, however, the needle type sealing element becomes a large cylindrical component which projects more than nominally, besides transmitting a great deal or even all the power, the design must be classified as a rolling piston unit. Hence the locus of the c.g. of the rolling piston about its longitudinal axes must be considered in order to classify this configuration correctly.

These machines thereby obtain cam-engagement due to the additional freedom of rotation given to the power transmitting component; indeed, these machines have become hybrids of two engagement methods.

Cam-engagement becomes more and more pronounced because the reciprocating and slip-engagement become partly or entirely superfluous as rolling elements develop into a rolling piston which also, of course, transmits the power.

Parallel sided guide slots in which the engaging parts may slide to and fro are fundamental features of the first PROM VI machines shown in line 1, table 27. The