viation from strict parallelism is wholly insensible; and let A, B, C, D, E, (Fig. 409,) represent these rays. There must evidently be one of these rays (C,) and only one, which, by continuing its rectilineal course, would arrive at the point (R) intended to be the focus of the rays. This ray, then, may be suffered to pass on, without being subjected to any refraction; the surface of the medium should, therefore, be presented to the ray (at I) perpendicularly to its course, so that it may pass through at right angles to that surface. Those rays (B and D) which are situated very near to this direct or central ray (C,) will require but a small degree of refraction in order to reach the focus (R;) this small refraction will be effected by a slight degree of obliquity in the medium at the points (H and K) where those rays meet it. In proportion as the rays (such as those at A and E) are more distant from the central ray, a greater amount of refraction, and consequently a greater obliquity of the surfaces (G and L) will be required, in order to bring them to the same focus.

The convergence of these rays, after they have passed this first surface, which would have brought them to the point R, may be farther increased by interposing new surfaces of other media at the proper angles. If the new medium be still denser than the last, the inclination of its surface must be similar to that already described; if rarer, they must be in an opposite direction. This last case also is illustrated in the figure, where M, N, O, P, Q, show the inclinations of the surfaces of a rarer medium, calculated to increase the convergence of the rays, that is, to bring them to a nearer focus (F.) The result of the continued change of direction in the refracting surface, is a regular curvilineal surface, which, in the present case, approaches very nearly to that of a sphere. Hence by giving these refractive media spherical surfaces, we adapt them, with tolerable exactness, to produce the convergence of parallel rays to a focus, and by making the denser medium convex on both sides (as shown in Fig. 410,) both surfaces will conspire in producing the desired effects. Such an instrument is termed