Cushman's Combination Lathe Chuck.*

The cuts show in detail a chuck described in the columns of THE POLYTECHNIC REVIEW, before being made known publicly. In all shops where the work done varies constantly and greatly in size and shape, it is desirable to have a "combination" chuck that can, quickly and at will, be made either concentric or eccentric (that is, with universal or independent jaws), without removal from the lathe-spindle. A good chuck should be light and strong, easy to handle, having a positive jaw-motion and a firm grip, and with no uncovered slots or spaces to let in dirt or chips. It may, in some cases, be an advantage if, when the jaws are *set* eccentrically, they can be *moved* together.

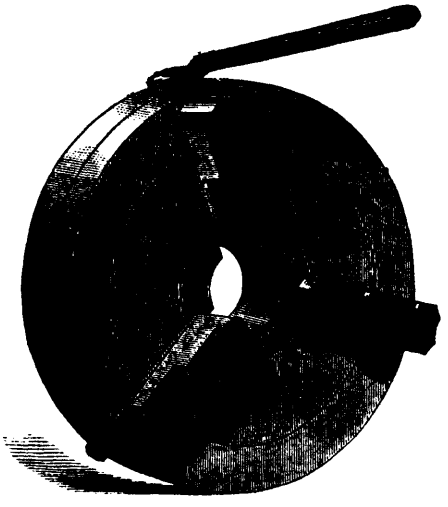

Fig. 1.

The Cushman chuck (which is made with three or with four jaws, as desired) has its jaws (which slide in radial slots on its face) long enough to completely close the slots against access of chips or dirt. Each jaw (which is three-stepped, as shown in the cuts) is reversible, so that the highest steps may be placed inwards to hold drill or reamer shanks, etc.

The foot or inward projection of each jaw is cut into a half-nut, *A* (see Fig. 2), and engages with a square-headed screw, *B*, projecting through the rim. The screw, *B*, bears below its square head, and inside the rim, a bevel-pinion engaging in a circular rack, *CC*. Turning any one screw will swerve the rack circle *CC*, and move every jaw concentrically. But the toothed ring, *CC*, rests upon a plain ring, *DD*, the periphery of which is threaded to correspond with the interior of the shell; hence, if this ring be swerved in one direction, it will be advanced towards the chuck-face, and *vice versa*. By this means the circular rack and its bevel-pinions may be meshed (as shown in Fig. 3), or unmeshed, (as seen in Fig. 4); in either

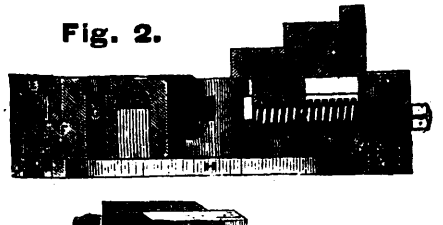

Fig. 2.

Fig. 3.

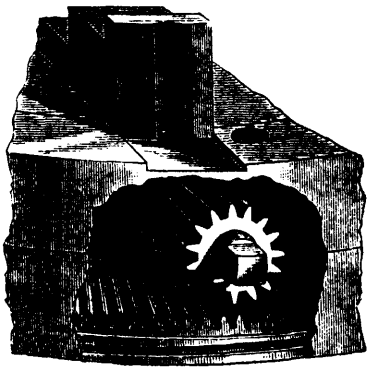

Fig. 4.

case the ring being held by a spring-catch. By pressing the thumb upon this catch the supporting ring may be turned by a knob at the back of the chuck (see Fig. 5), thus enabling the circular rack to be unmeshed and any jaw separately moved nearer to, or farther from, the center than the others, thus making an eccentric chuck. By again meshing the pinions

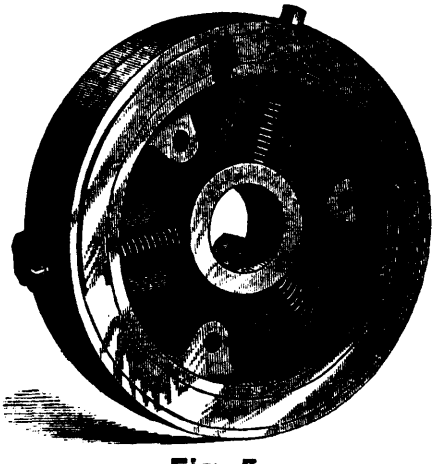

Fig. 5.

and rack, these eccentrically placed jaws may be moved simultaneously. As built, the center holes are proportionably very large; the parts are few, and of steel. *Polytechnic Review.*

Permeability of Building Materials to Gases and Vapors.—Mm. Marcker & Berthold, of Paris, have lately made some suggestive announcements as to the permeability to gases and vapors, of various materials used for building purposes. They claim as the result of their experimental researches, that when dry bricks, sandstone, tufa mortar and cements permit vapors to pass through them, while granite, porphyry, slate, alabaster and limestone are practically quite impermeable. It will be inferred from these statements, therefore, that the cementing of cellar floors, etc., or laying them with bricks or tiles, while it doubtless will considerably increase the wholsomeness of a dwelling exposed to dangerous gaseous exhalations from sewers and the like, does not afford a complete protection. Whitewash applied to a wall, though it exerts for a considerable time a purifying chemical influence, does not afford nearly so good a protection against the passage of gases and vapors as a couple of coats of oil paint, while thick glazed wall paper reduces the permeability of mortar nearly 40 per cent. These researches teach an important sanitary lesson.