end of cylinder will exhaust through passage Q *via* the groove *n* and passages *o, i, j, k,* to the atmosphere; the front end of the passage P will be uncovered by the front end of the piston at the same time as the front end of the passage Q and the fluid in space *e* will escape through passages P Q, groove *n*, and passages *o, i, j, k,* to the outer air. Passage P being larger than passage X by which the fluid is supplied to the space *e*, the pressure on the large area *c* of the valve O will be greatly diminished, so that the pressure acting on the small area *d* of the valve O will force the valve forward to the position of Figs. 5 and 7, whereupon the ring *b* of the valve O will close the passage X and cut off the supply of fluid to space *e*, thereby permitting pressure at *d* to hold the valve in the forward position. The annular space *p* will now be opened from which fluid pressure *via* W and *e*1 will pass to the interior of the valve, and acting on the rear end of the piston will first bring it to rest forming a cushion and later drive the piston forward. As the piston moves forward and finally strikes a blow on the chisel the air in front can escape through passage Q until the latter is closed by the front end of the piston and thereafter can escape through passage R, grooves *m*, *a* and *n*, and passages *o, i, j,* and *k,* to the atmosphere. When the piston is moved so that T and T1 are in communication *via* groove M1, fluid under pressure will pass *via* T1, M1, T and U to space *e*, and acting on the large area *c* of the valve O will overcome the constant pressure on its small area *d* and force the valve backward, and thus open X, admitting more fluid to space *e* to hold the valve in that position; also fluid will pass from *e* to R *via* S and to the front end of the piston to assist in driving the piston back. The recoil accomplishes most of the return of the piston. During the backward movement of the piston, the end of the cylinder is open to exhaust through slots *l* in the valve O and groove *h* and passages *i, j, k,* until the passages P and Q are uncovered by the front end of the piston, at which time the valve opens, and, admitting fluid, arrests the piston and drives it forward. Although communication between T and T1 is cut off almost directly the piston commences its backward movement, the valve O will not change its position (from rear to front) because sufficient fluid pressure is passing into space *e* through passage X to hold the valve notwithstanding the escape of the fluid *via* S, since the latter is of less capacity than X. It will be readily understood that the action of the compressed air along the passage G, acting first on one area and then on another area of the valve O, drives it in alternate directions, and that the valve in turn admits air to either end of the cylinder; at the same time the piston opens and closes certain ports in the cylinder as in the case of the valveless hammer, and the combination of the dual motions of the valve and the piston produces the desired result of causing the piston