forward to return the piston. When the piston is in the position shown in Fig. 4—air travels through the passage K to the rear of valve—forcing it forward by reason of the greater area of the rear end of valve—see Fig. 4—this action connects the D passage with the front groove in valve block and supplies air to front end of piston driving same to the rear. The air is exhausting out from the rear of piston through the passages Gx through the valve and Mx to the atmosphere. When the piston on its rearward stroke passes the passage Gx there is a live air cushion formed between it and the valve block—by reason of exhaust Gx being closed and live air flowing through the small ports S.S front groove in valve block. The momentum of the piston on its rearward stroke coming into this live air cushion, causes the valve to be shifted rearwardly and to the position shown in Fig. 3, which completes the cycle of the movement. The port Vx is to prevent any air having a retarding influence on the valve on its rearward travel.

"BOYER" HAMMER.—Figs. 2, 5, 6, 7, 8, 9, show several sectional views of a "Boyer" hammer, in which the following letters of reference indicate the various parts referred to:—A, the working cylinder; D, the handle; G, the air passage from throttle valve to cylinder; G1, throttle valve; H, trigger actuating same; I, the valve block; I1, cap at end of same; K, the working tool; M, the piston, consisting of a solid piece of turned steel fitting the bore of the cylinder and provided with a recess M1; O, the valve; P, passage from cylinder to small space *e*; Q, passage from cylinder to small space *n*; R, passage from front end of cylinder to small space *m;* S, port leading from space *e* to front of cylinder through passage R; T, passage from cylinder through U to space *e*; T1, from air-supply to cylinder; X, from air-supply to *e*.

X is only necessary to supply fluid to front end of piston *via* S and R and to hold the valve in rear position. Other letters on the drawings are referred to in the following description of the working of the hammer:—Figs. 2 and 6 represent the piston in its forward, and the valve in its rearward position. The motive fluid having been admitted passes along the passage G and then through W into space *e*1 and acts on small area *d* of the valve O, and tends to force the valve forward, but fluid pressure in space *e* admitted by the passage X acting upon the large area *c* of the valve O will hold the valve in the rearward position against the pressure acting on the small area *d*. The fluid will pass from space *e* through passages S and R to the front end of the piston driving the latter backward, the rear end of the cylinder being open to exhaust through the slots *l* in valve O and groove *h*, the latter being constantly open to the atmosphere through passages *i*, *j*, *k*. As the piston moves backwards, it uncovers ports P and Q, and the pressure in front