small slide valve (5) driven by the flywheel shaft connects the cylinder to the vacuum line. Atmospheric pressure acting on the outside of the piston forces it into the cylinder, thus rotating the flywheel. When the piston reaches the top of its stroke the slide valve (5) opens the cylinder to the air, permitting the inertia of the flywheel to pull it back to the position where the cylinder is once more evacuated. The pulsator valve (6) is operated at one-half the speed of the slide valve (5) by means of gearing (7). This valve is shown diagramatically in figures 10a and 10b. In the positions shown in Fig. 10a the valve is connecting lead (1) to the vacuum and lead (2) to the air. Fig. 10b shows the valve in the opposite position.

This type of pulsator requires adequate lubrication. As the speed varies greatly with the load on the driving mechanism, it is important to use an oil which is not too viscous and to clear away regularly any old oil containing dust and dirt, which would impede the smooth working of the valves. All valves should be ground once in a while, although with care these pulsators will run for years without attention if well lubricated.

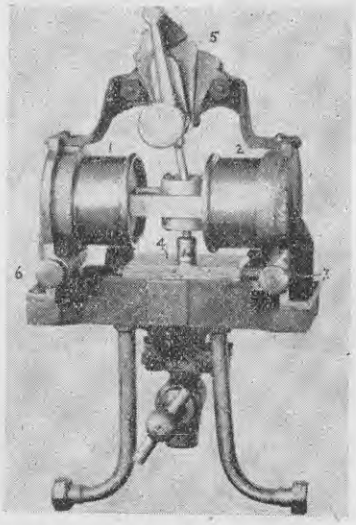

Fig. 11(a).—Another type of automatic pulsator.

Another type of automatic pulsator is essentially a double-acting vacuum engine directly coupled to the pulsator slide valve. The device is shown in Figs. 11a and 11b. As can be seen, it is in appearance rather complex, although the action is relatively simple. The two driving cylinders are shown at (1) and (2). These are connected to the vacuum via the piston valve system in the cylinder (3). The main pulsator valve (4) is of the double-acting variety, and on the same slide are drilled small auxiliary ports which operate the valve system. The mechanism shown at (5) is an ingenious device for halving the pulsator rate for the releaser.

The action of the device is as follows:—When the pulsator valve reaches the end of a stroke the auxiliary ports connect the valve piston to the vacuum in such a manner that the piston moves to connect the main cylinder on the opposite end to the vacuum, and the other main cylinder to the air. This causes the pulsator valve to move back to the opposite end of the stroke, where the process is repeated. The speed of the pistons is controlled by the two needle valves shown at (6) and (7).

The chief factors governing the speed of the pulsator once the needle valves have been set are:—(a) The vacuum: the higher the vacuum the faster the device operates; (b) the viscosity of the oil in the driving cylinders and in the valve cylinder. This also applies to most automatic type pulsators, and the same precautions are required for regular action.