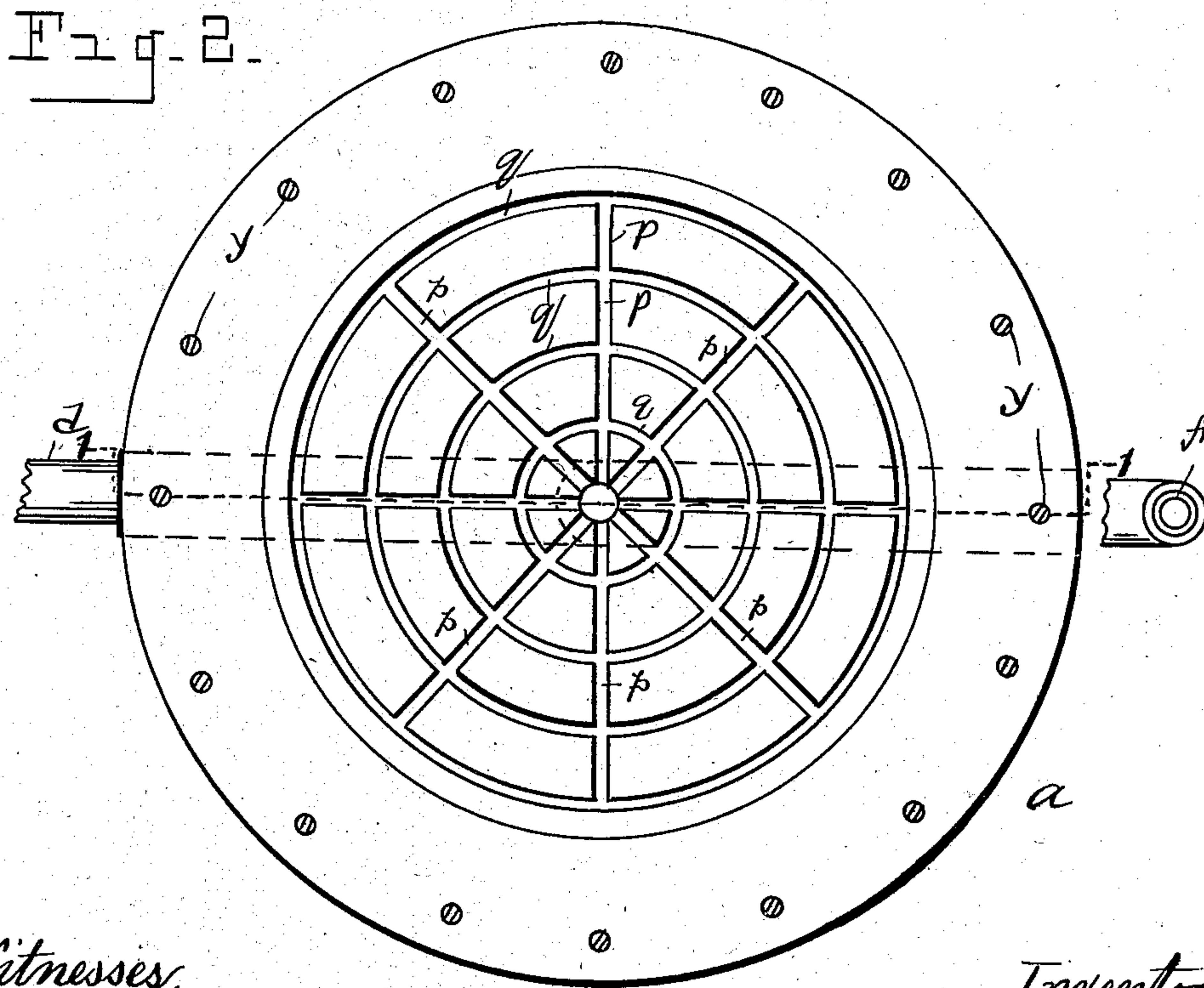
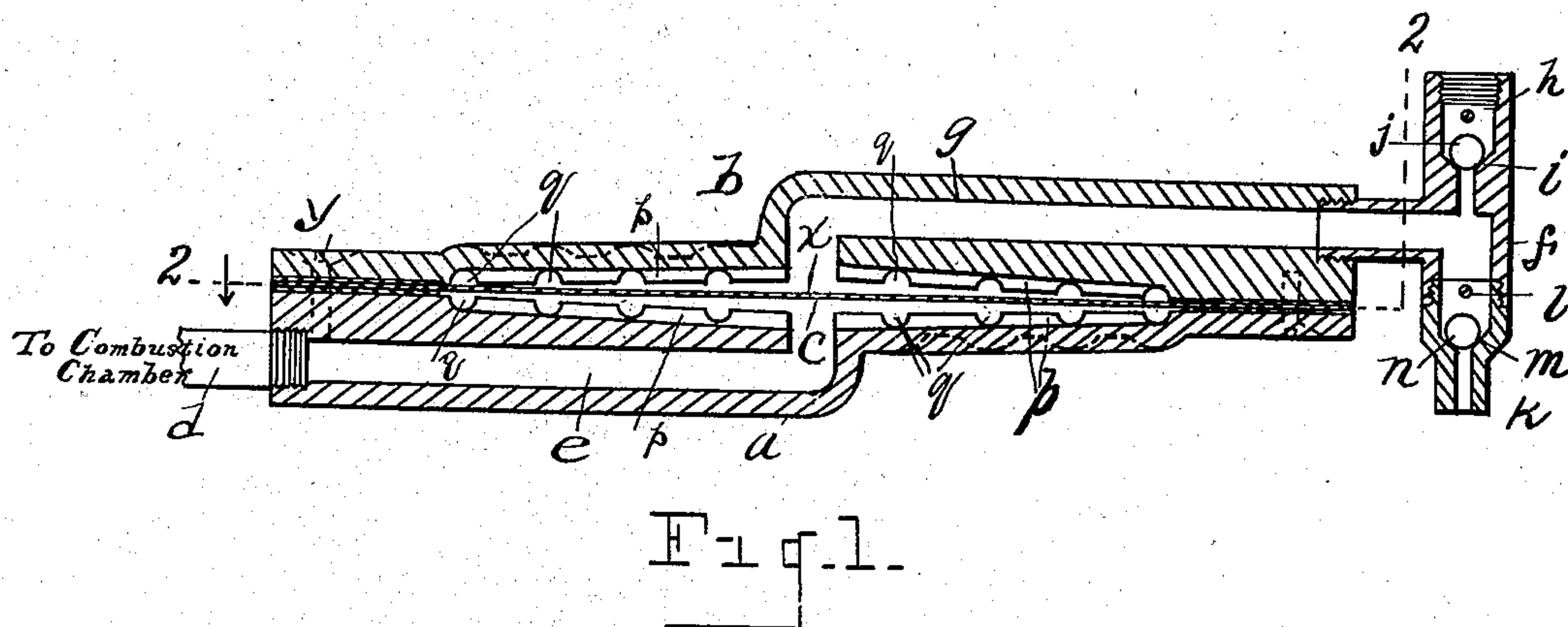


No. 885,835.

PATENTED APR. 28, 1908.

A. P. BRUSH.  
PULSATING PUMP.  
APPLICATION FILED AUG. 18, 1906.



Witnesses,  
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his Attorney.



# UNITED STATES PATENT OFFICE.

ALANSON P. BRUSH, OF DETROIT, MICHIGAN.

## PULSATING PUMP.

No. 885,835.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed August 18, 1905. Serial No. 274,776.

*To all whom it may concern:*

Be it known that I, ALANSON P. BRUSH, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in a Pulsating Pump, of which the following is a specification, reference being had to the accompanying drawings, which form a part of this specification.

My present invention is designed to provide a pulsating pump for various uses, the same being of economical construction and of superior utility.

My improved pump is especially adapted for use upon automobiles equipped with internal combustion engines, but the invention may be applied also to marine engines, as well as for various other purposes.

I will describe my invention as employed in connection with an internal combustion engine.

My invention consists of the construction, combination and arrangement of parts hereinafter specified and claimed and illustrated in the accompanying drawings in which

Figure 1 is a view in section on line 1—1, Fig. 2. Fig. 2 is a view in section on the line 2—2, Fig. 1.

In carrying out my invention, as illustrated in the accompanying drawings, *a* and *b* represent the lower and upper plates of a pulsating pump constructed with a chamber *c* between their peripheries, the capacity of the chamber being shown somewhat exaggerated, relatively, in Fig. 1 of the drawings submitted herewith. The plate *a* is shown centrally concaved and the plate *b* centrally concaved on their adjacent faces to form said chamber. Within said chamber is located an elastic or pulsating diaphragm *x*. The plates may be united at their peripheries in any suitable manner as by bolts *y*. The plate *a* is provided with a channel *e* leading to the chamber *c*, with which is connected a pipe *d* employed to connect the said chamber of the pump with the combustion chamber of the engine. The plate *b* is provided with a channel *g* leading to the chamber *c*, with the outer end of which is connected a channeled valve case or fitting *f*. The discharge end *h* of said case or fitting is constructed to be connected with a discharge pipe (not shown), and is provided with a valve seat *i* and a valve to seat thereupon, as a ball valve *j*. The opposite or suction end *k* of said valve case or fitting is constructed with a chamber

*l* provided with a valve seat toward its outer end as shown at *m* controlled by a suitable valve, as by ball valve *n*. The plates *a* and *b* are shown constructed with opposed radially extended channels *p* on their inner surfaces, and with opposed annular channels *q* communicating with the radial channels.

The pulsating diaphragm *x*, it will be understood, is actuated by the pulsations of pressure, *i. e.*, by the pulsations from the explosion chamber of the engine.

My invention aims to so construct the plates *a* and *b* that there will be no suction of the diaphragm *x* upon the adjacent faces of the plates to cause the adjacent surfaces thereof to adhere. This I obviously accomplish by channeling the adjacent surfaces of said plates, as shown and described. I would have it understood, of course, that I do not limit myself to the exact form of channeling the adjacent surfaces of said plates herewith specified and illustrated, as the adjacent surfaces thereof might be variously channeled or grooved to accomplish the desired object. A pump so constructed can be used for pumping liquid or air. It may be employed, for example, as a fuel pump to pump fuel to the engine; or as an air pump to set up an air pressure upon the tank; or as a water pump to circulate water through the water jacket of the engine. In a marine engine it may be used, for example, instead of the ordinary pump.

A pump so constructed will work with the engine when running at full load or when the engine is running with no load.

It will readily be understood that an explosion in the explosion chamber of the engine forces the diaphragm to its extreme position, and that the exhaust stroke allows the diaphragm to recover itself.

It is obvious that the diaphragm actuated to the full pressure of an explosion would be soon destroyed unless the plates were so formed that it could not be forced beyond its elastic limit. With the plates formed as above described so as to keep the diaphragm within its elastic limit it is impossible for an explosion to strain the diaphragm in any way, even though it is made thin enough to be actuated by a very light pulsation or fluctuation of pressure.

My invention aims to provide a pulsating pump wherein the operation of the pulsating diaphragm will be well within its elastic limit.

In the operation of the device it will be



evident that the suction stroke of the engine will unseat the valve *n*, drawing in liquid or air, as the case may be, into the channel *g*, while the opposite pulsation of the engine will produce a pressure upon the liquid or air drawn into the channel *g*, thereby unseating the valve *j* and forcing the liquid or air out from the discharge end of the valve case or fitting *f*.

10 What I claim as my invention is:

1. A pulsating pump having in combination connected plates forming an interior chamber therebetween and a pulsating diaphragm located between said plates within said chamber, each of said plates provided with a passage leading into said chamber, the inner walls of said chamber channeled on their adjacent surfaces on opposite sides of the diaphragm to prevent the adherence of the diaphragm thereupon by suction.

2. A pulsating pump having in combination a chambered case, a pulsating diaphragm located within the chamber of the case, said case provided with passages leading into said chamber on opposite sides of the diaphragm, and means to control the inlet into and the discharge from one of said passages, the interior walls of said chamber channeled on their adjacent surfaces on opposite sides of the diaphragm to limit the movement of the diaphragm.

3. A pulsating pump having in combination a chambered case, a pulsating diaphragm located within the chamber of the case, said case provided with passages leading into said chamber on opposite sides of the diaphragm, means to connect one of said passages with the combustion chamber of an internal combustion engine, and means connected with the other of said passages to control the admission and discharge therefrom, the interior walls of said chamber channeled on their adjacent surfaces on opposite sides of the diaphragm to limit the movement of the diaphragm.

4. A pulsating pump having in combination a chambered case, and a pulsating diaphragm located within the chamber of the case, the interior walls of the case channeled upon their adjacent surfaces upon opposite sides of said diaphragm for the purpose set forth.

5. A pulsating pump having in combination connected plates forming an interior chamber therebetween and a pulsating diaphragm located within said chamber, the interior surfaces of said plates provided with channels or recesses upon opposite sides of the diaphragm for the purpose set forth.

6. A pulsating pump having in combination connected plates forming an interior chamber therebetween and a pulsating diaphragm located between said plates within said chamber, each of said plates provided with a passage leading into said chamber, the adjacent walls of said plates provided with channels or recesses upon opposite sides of the diaphragm for the purpose set forth.

7. A pulsating pump having in combination connected plates forming an interior chamber therebetween and a pulsating diaphragm located between said plates within said chamber, each of said plates provided with a passage leading into said chamber, the adjacent walls of said plates provided with channels or recesses upon opposite sides of the diaphragm, a channeled valve case connected with the outer end of one of said passages, and means to control the inlet into and the discharge from the channeled valve case, for the purpose set forth.

8. A pulsating pump having in combination connected plates forming an interior chamber therebetween and a pulsating diaphragm located between said plates within said chamber, each of said plates provided with a passage leading into said chamber, the adjacent walls of said plate provided with channels or recesses upon opposite sides of the diaphragm, means to connect one of said passages with the combustion chamber of an internal combustion engine, a channeled valve case connected with the other of said passages to admit and to discharge liquid or air from the corresponding passage, and means to control the admission and the discharge into and from the said valve case.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

ALANSON P. BRUSH.

N. S. WRIGHT,  
E. L. SCHWARTZ.