No. 805,430. PATENTED NOV. 21, 1905.

A. VOGT.

MEANS TO REGULATE THE POWER OF EXPLOSION ENGINES.

APPLICATION FILED DEC. 16, 1903.

Fig. 2.

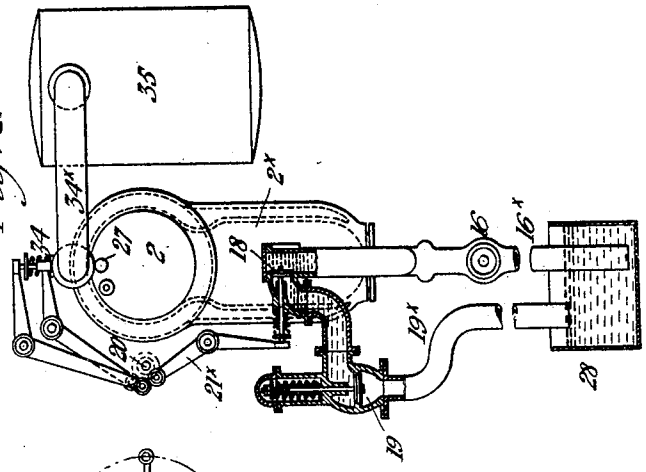


Fig. 1.

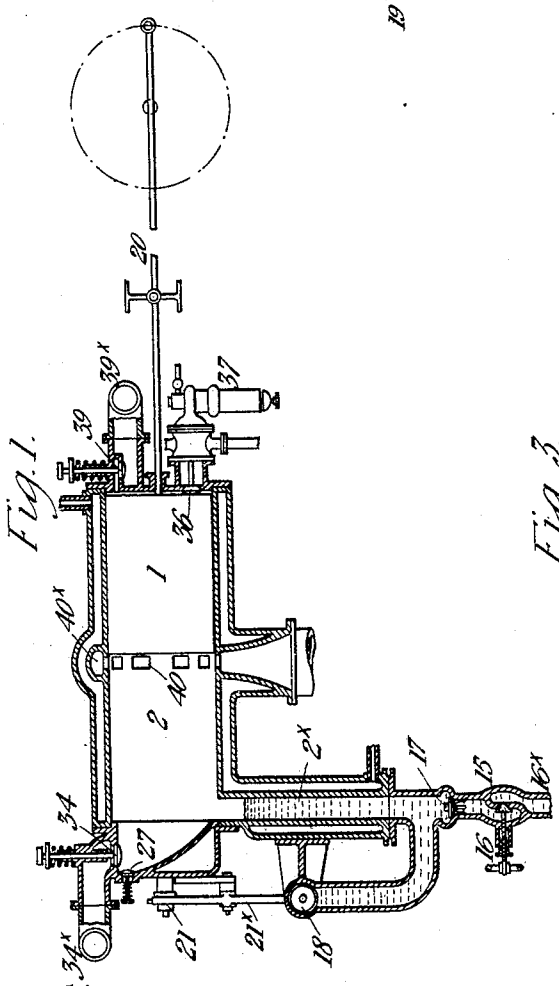
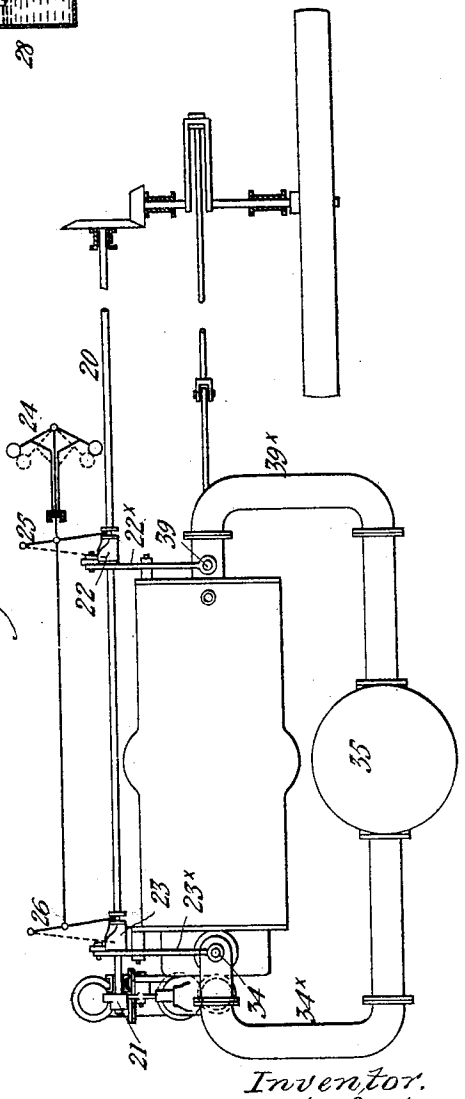


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

ADOLF VOGT, OF WEST NORWOOD, ENGLAND.

MEANS TO REGULATE THE POWER OF EXPLOSION-ENGINES.

No. 805,430. Specification of Letters Patent. Patented Nov. 21, 1905.

Original application filed January 9, 1902, Serial No. 89,072. Divided and this application filed December 16, 1903. Serial No. 185,379.

To all whom it may concern:

Be it known that I, ADOLF VOGT, a subject of the King of Great Britain and Ireland, residing at 91 Thornlaw road, West Norwood, in the county of Surrey, England, have invented certain new and useful Improvements in Means to Regulate the Power of Explosion-Engines, of which the following is a specification.

This invention, which is a division of my application dated January 9, 1902, Serial No. 89,072, relates to a modification of the construction of internal-combustion motors described in the specification to the said application, wherein the combustible charge compressed by the instroke of the piston is contained in a compression-chamber, the capacity of which can be varied by the introduction of more or less liquid in order to maintain the compression-pressure of the charge constant, notwithstanding that the volume of the charges admitted is made to vary. According to the present invention the construction of the motor described in my said prior application for this purpose is modified, so as to act as a two-stroke cycle-motor, the front end of the motor-cylinder being closed, so as to cause it to act as a pump for drawing in the combustible charges, as I will describe with reference to the accompanying diagrammatic drawings, in which—

Figure 1 shows a longitudinal section of the motor; Fig. 2, a back view, partly in section; and Fig. 3, a plan.

As regards one of the main features of the construction, it should be stated that this is the same as described in my said prior application—that is to say, the cylinder 2 has a sack-like chamber $2^{\times}$, the capacity of which is somewhat larger than is required for the maximum compression-space and which has at its lower end a valve-chamber 15, containing a regulating-valve 16 for controlling the admission of liquid through a pipe $16^{\times}$, a check-valve 17 for the admission of liquid from $16^{\times}$ into the chamber $2^{\times}$ and a mechanically-actuated valve 18 for controlling the communication of chambers $2^{\times}$ and 15 with an escape-pipe $19^{\times}$ through a loaded valve 19, which is held closed with a certain regulatable pressure by a spring, as shown. The pipes $16^{\times}$ and $19^{\times}$ can both communicate with one and the same tank 28, as shown at Fig. 2. These several devices operate in the same manner as described in my said prior application, and their functions need therefore not be further described. The cylinder 2 and piston 1 are, however, modified, so as to act with a two-stroke instead of with a four-stroke cycle, as follows: The cylinder is constructed, as in many two-stroke cycle-motors, with exhaust-passages 40 at its middle, which are uncovered at the end of the forward stroke of the elongated piston 1 for the escape of the combustion-gases through the annular channel $40^{\times}$. The front end of the cylinder is closed and acts in conjunction with the piston 1 as a pump for the combustible charges, which during the back stroke are drawn through the suction-valve 36 from a mixing device 37. On the forward stroke the piston forces the charge through valve 39, pipe $39^{\times}$, into reservoir 35, (which may be expansible,) whence toward the end of such stroke it passes through pipe $34^{\times}$ and inlet-valve 34, (which is then held open,) into the back end of the cylinder, in which after driving out the remainder of the combustion-gases through 40 it is afterward compressed by the back stroke of the piston when this has passed the openings 40. During such compression-stroke a fresh combustible charge is drawn in on the front side of the piston.

The counter-shaft 20, running at half the speed of the engine-shaft, carries three valve-actuating cams 21 22 23, of which 21 is fixed on the shaft and serves for keeping open the valve 18 during the compressing stroke by means of a lever $21^{\times}$. The cams 22 and 23 rotate with but can slide longitudinally upon the shaft and are formed with inclines, as shown, the cam 22 being made to operate the valve 39 by a lever $22^{\times}$, so as to hold it open during the forward stroke of piston, while the cam 23 operates the inlet-valve 34 by a lever $23^{\times}$, so as to open it toward the end of that stroke. The cams 22 and 23 are connected to a governor, of which a diagrammatic illustration is shown at 24, Fig. 3, the motion of which is communicated to the cams, respectively, by levers 25 and 26 in such manner that when the motor is running at the normal speed the governor brings the cam 22 into such a position that it holds the valve 39 open during the forward stroke of the piston only, causing this and also valve 34 to close at the end of such stroke, so that a maximum charge is then compressed by the piston's back stroke and is forced into the chamber $2^{\times}$, where (valve 18 being then open) a certain quantity of liquid that had been drawn in during the forward stroke is expelled through

the loaded valve 19 when the desired compression-pressure has been reached.

When the speed of the motor increases beyond the normal, owing to the decrease of the load thereof, the governor brings the cams 22 and 23 into such a position that they continue to hold the valves 34 and 39 open during part of the back or compressing stroke. By this means a portion of the charge drawn in behind the piston is expelled again through valve 34 into the reservoir 35, and a corresponding portion at the same time passes from the reservoir back through the valve 39 into the front end of the cylinder. The charge compressed by the piston will consequently be correspondingly reduced, and as this reduced charge will occupy less space in the chamber $2^{\times}$ less liquid will be forced out through valve 19 when the desired compression-pressure is reached, so that the compression-space will be reduced in proportion to the reduced charge, while the compression-pressure will remain constant. During the time that the said portion of the charge is passing back into the front end of the cylinder no fresh charge will enter through the suction-valve 36, so that the volume of fresh mixture drawn in during the back stroke will be correspondingly reduced.

When the charge is very considerably reduced owing to the diminished load on the motor, the expansion of the combustion-gases may be extended to below atmospheric pressure toward the end of the piston's stroke, as in this construction of motor the usual discharge-valve for the cylinder is done away with, that would open automatically in the above case. A "snifting" or air-inlet valve is provided at 27 through which air will enter the cylinder as soon as the pressure therein sinks below the atmosphere.

Having thus described the nature of my said invention and the best means I know of carrying the same into practical effect, I claim—

1. In a two-stroke cycle internal-combustion motor, a cylinder having its front closed end acting as a pump for drawing in combustible charges through a suction-valve, an outlet-valve at said front end communicating by a pipe and connected reservoir to an inlet-valve at the back end of the cylinder, cams controlling said valves so as to cause them to allow a charge drawn into the front end of the cylinder to pass through said pipe into the back end of the cylinder, a governor controlling said cams adapted to bring these into position for holding the said outlet and inlet valves open during the first part of the compression-stroke of the piston, when the normal speed is exceeded, whereby a portion of the charge admitted at the back end of the cylinder will pass back into the front end again, substantially as and for the purpose described.

2. In a two-stroke cycle-motor, a cylinder having its front closed end acting as a pump for drawing in combustible charges through a suction-valve, an outlet-valve at said front end communicating by a pipe and connected reservoir to an inlet-valve at the back end of the cylinder, cams controlling said valves so as to cause them to allow a charge drawn into the front end of the cylinder to pass through said pipe into the back end of the cylinder, means for holding the outlet-valve and inlet-valve open during part of the compression-stroke when the normal speed is exceeded so as to cause a part of a charge to pass back to the front end of the cylinder again, so as to reduce the charge to be compressed, and a chamber for containing the compressed charges, means for the introduction of more or less liquid into said chamber to vary the capacity thereof to correspond with the variations of the compressed charges, substantially as described.

3. In a two-stroke cycle-motor, a cylinder having its front closed end acting as a pump for drawing in combustible charges through a suction-valve, an outlet-valve at said front end communicating by a pipe and connected reservoir to an inlet-valve at the back end of the cylinder, cams controlling said valves so as to cause them to allow a charge drawn into the front end of the cylinder to pass through said pipe into the back end of the cylinder, means for holding the outlet-valve and inlet-valve open during part of the compression-stroke, when the normal speed is exceeded, to cause a part of a charge to pass back to the front end of the cylinder again, and reduce the charge to be compressed, a chamber for containing the compressed charges, means for introducing liquid into said chamber during the forward stroke of the piston, and a loaded escape-valve communicating with said chamber, adapted to open automatically for the discharge of liquid from the chamber when the pressure of the compressed charge exceeds a predetermined amount, substantially as described.

4. In a two-stroke cycle-motor, a cylinder having its front closed end acting as a pump for drawing in combustible charges through a suction-valve, an outlet-valve at said front end communicating by a pipe and connected reservoir to an inlet-valve at the back end of the cylinder, cams controlling said valves so as to cause them to allow a charge drawn into the front end of the cylinder to pass through said pipe into the back end of the cylinder, means for holding the outlet-valve and inlet-valve open during part of the back stroke when the normal speed is exceeded so as to cause a part of a charge to pass back to the front end of the cylinder again, so as to reduce the charge to be compressed, and a snifting-valve in the back end of the cylinder for admitting air into the same when the combus-

tion-gases expand below the atmospheric pressure, substantially as described.

5. In a two-stroke cycle internal-combustion motor, the combination with a cylinder having a piston therein dividing said cylinder into an explosion and a pump chamber; of a pipe connecting said chambers, a reservoir connected to the pipe, governor-controlled valves at each end of the pipe and held open during a portion of a stroke when the speed exceeds normal, and means to automatically vary the compression-space to maintain a substantially constant compression-pressure.

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

ADOLF VOGT.

Witnesses:
EDWARD GARDNER,
WALTER J. SKERTEN.