

J. B. BROWN.
GAS ENGINE.
APPLICATION FILED JULY 2, 1908.

976,034.

Patented Nov. 15, 1910.

FIG. 1.

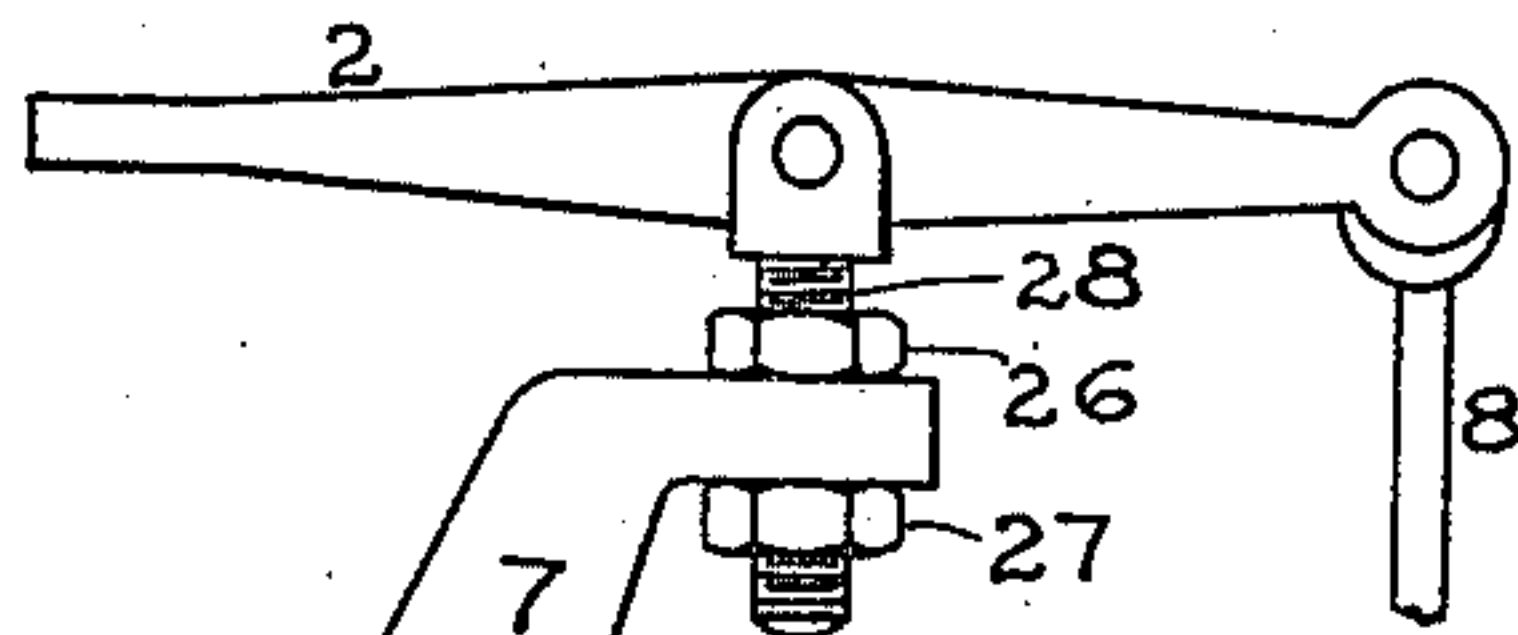
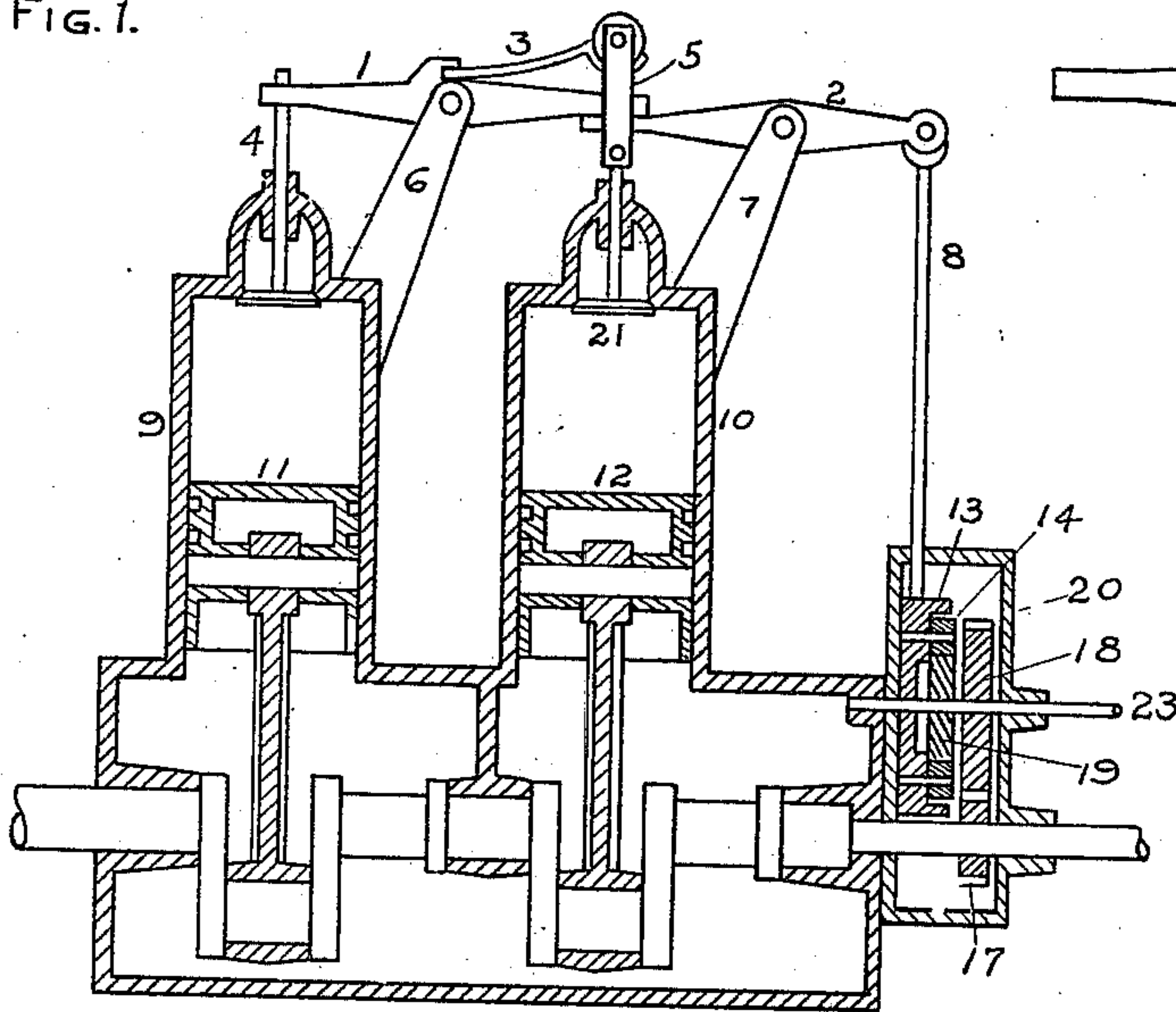


FIG. 10

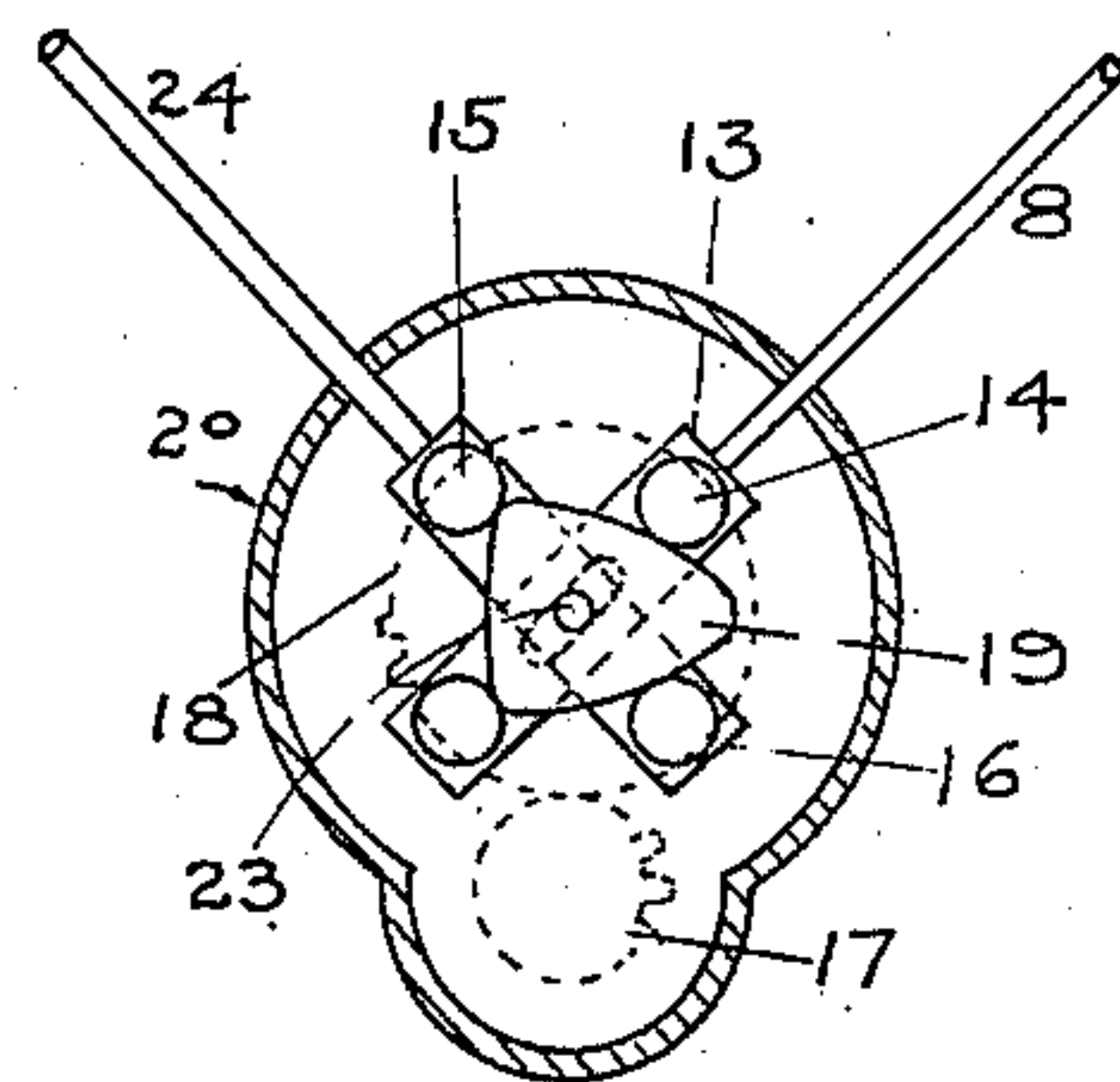


FIG. 4.

FIG. 9.

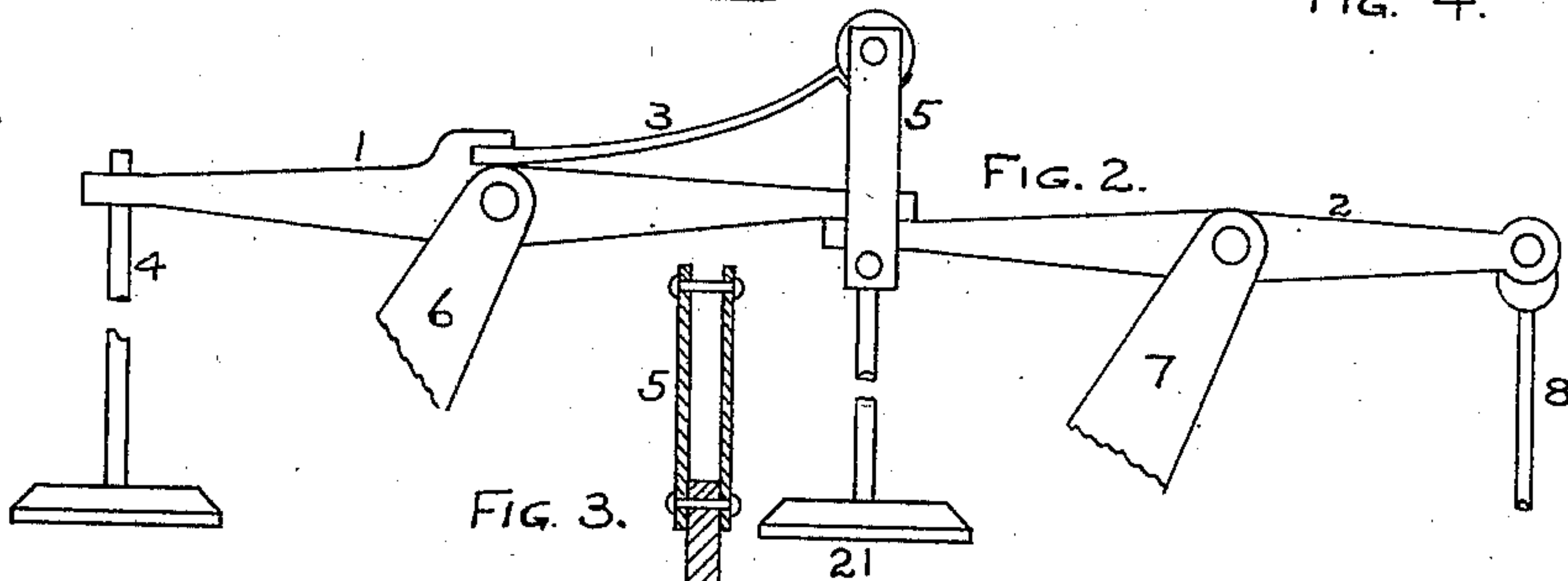


FIG. 2.

FIG. 3.

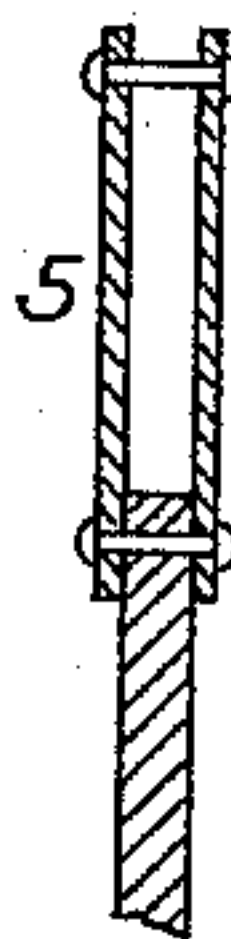


FIG. 5.

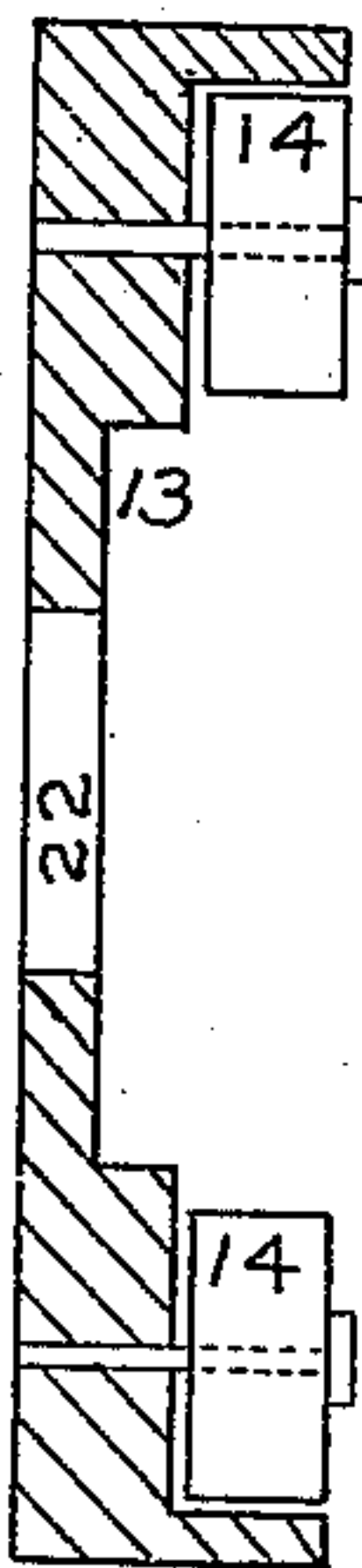


FIG. 6.

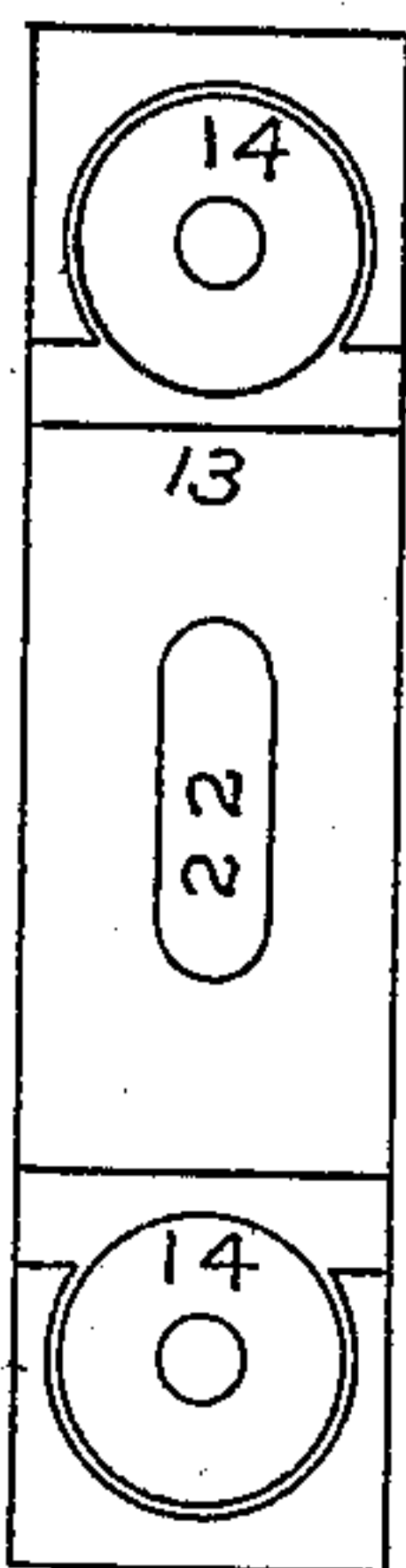


FIG. 7.

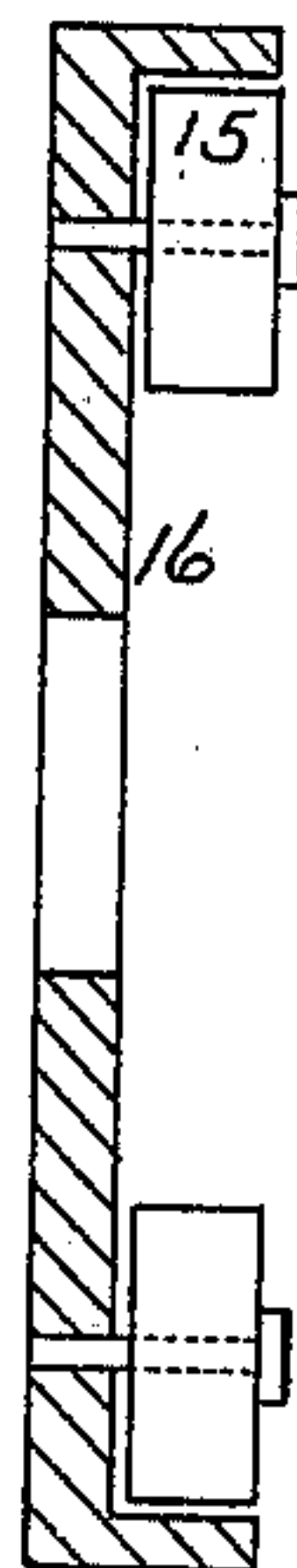
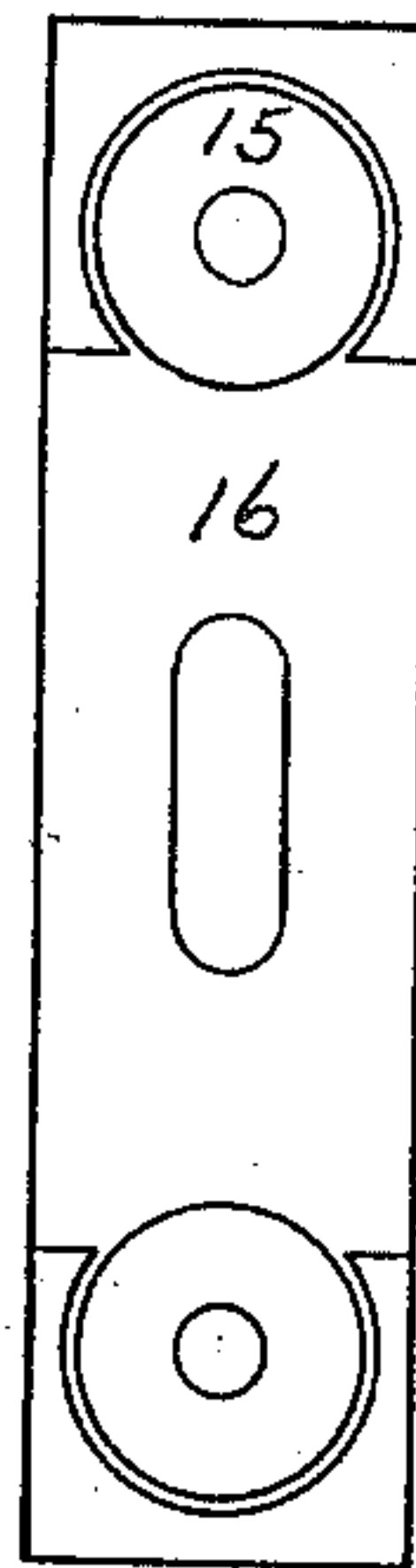


FIG. 8.



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JESSE B. BROWN, OF BELDING, MICHIGAN.

GAS-ENGINE.

976,034.

Specification of Letters Patent.

Patented Nov. 15, 1910.

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To all whom it may concern:

Be it known that I, JESSE B. BROWN, a citizen of the United States, residing at Belding, in the county of Ionia and State of Michigan, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification.

My invention relates to gas or gasoline engines, and its object is to provide a simple, durable and reliable method of operating the exhaust valves of such engines, especially where two cylinders are employed and effecting the control of the exhaust valves of both cylinders, with the use of only one spring. I obtain this result by the device set forth in the accompanying drawings, in which—

Figure 1 is a vertical section of a gasoline engine employing my device on a line passing through the center of the engine shaft; Fig. 2 is a view of the valve controlling levers on an enlarged scale; Fig. 3 is an elevation of the cam system controlling the valves, as applied to a four-cylinder engine; Fig. 4 is a vertical section of the gear case and valve actuating cam; Figs. 5, 6, 7, 8, and 9 are detailed views of the different parts of the device, the purpose of which will be more fully explained farther on; Fig. 10 shows a modified view of the lever supports 6 and 7, to permit adjustment of the levers 1 and 2.

In the drawings, 4 and 21 represent the exhaust valves of a double cylinder gas or gasoline engine. A lever 1, pivotally mounted on an adjustable support, 6 is pivotally connected to the stem of the valve, 4, which is more fully shown in Fig. 9. A link 5 is connected to the stem of the valve 21. A vertical section of said link is shown in Fig. 3. The extremity of the lever 1 is adapted to move freely in link 5, and is pressed downward by a spring 3, one end of which abuts against the upper end of the link 5, and presses it upward; this extremity of lever 1 rests freely upon the extremity of lever 2; said lever is pivotally mounted on a support 7, which is preferably made adjustable as shown in Fig. 10, attached to the cylinder 10. A link 8 is pivotally connected to the opposite extremity of lever 2, at one end, and at the other end is attached to a cam-slide, 13, shown on an enlarged scale in Figs. 5 and 6; Fig. 5 being a longitudinal section and Fig. 6 a front elevation

thereof. Friction rollers 14 are mounted in the sockets formed to receive them, as shown in Figs. 5 and 6, near each extremity of strap 13; these rollers are preferably set in sockets formed a little larger than the rollers, so that if through any accident the roller axle is broken, the roller itself cannot become displaced, but will continue to operate until a new axle can be obtained. A slot 22 is cut in the center of strap 13, of such a size as to move freely on the cam shaft 23, and long enough to permit of the necessary longitudinal play of the strap 13. A cam 19 is mounted on the shaft 23 and is caused to revolve by a system of two to one gears, 17 and 18, so as to make one revolution of said cam to two revolutions of the engine shaft. The rollers 14 are set at such a distance apart, and the cam 19 is of such a form, that at any point in its revolution both of the rollers 14 will be in contact with it. The working point of the cam 19 is of the form usually employed in gas and gasoline engines, and is adapted to give the requisite motion to levers and controlling the exhaust valves.

The operation of my device is as follows: Suppose the cam 19 to be revolving in the direction indicated by the arrow; as the point of the cam moves forward it will raise the link 8 and with it, the extremity of the lever 2, depressing the opposite extremity of this lever and opening the valve 21; in doing so, it will press down the link 5 and compress the spring 3, thus firmly closing the valve 4 to the action of the spring 3 and opening the valve 12. The bearings on which the levers 1 and 2 turn, are preferably made adjustable in some suitable manner, for instance, that shown in Fig. 10, or this may be left unadjustable, as shown in Fig. 1, either form being equally within the scope of my invention.

If it is desired to use my device with a four cylinder engine it is only necessary to use an additional cam-slide 16, with rollers 15, working on the same cam 19, but situated at right angles to strap 13, the extra pair of cylinders being also at right angles to cylinders 9 and 10, and having their own system of levers exactly the same as those in Figs. 1 and 2, connected to strap 15 by link 24. It is evident that the cam-slide 15 will act upon its system of levers alternately, with the slide 13, but in exactly the same

manner and will operate the other pair of valves in exactly the same way as those already described. It will also be seen that by employing additional cam-slides almost any
 5 number of cylinders can be successfully operated from a single cam 19; all that is necessary being a set of levers and a single spring, such as is shown in Fig. 1 for each pair of cylinders, and means for connecting
 10 each of the set of levers with its own cam-slide, so as to operate at the proper time.

I claim as my invention and desire to secure by Letters Patent,

1. In combination, a lever having one extremity operatively connected with the exhaust valve of one cylinder of an explosive engine, and its opposite extremity in operative relationship with one extremity of a second lever; a spring having one extremity
 20 attached to said second lever and the other connected with the stem of the exhaust valve of a second engine cylinder and adapted, when compressed, to close said exhaust valves, with means for giving motion to
 25 said system of levers, substantially as described.

2. In combination, a lever fulcrumed between its extremities, and having one extremity operatively connected with the exhaust valve of one cylinder of an explosive engine, and its opposite extremity in operative relationship with one extremity of a second lever similarly fulcrumed; a spring having one extremity attached to said lever, and
 30 the other to the stem of the exhaust valve of a second engine cylinder and adapted, when compressed, to close said exhaust valves, with means for giving motion to said system of levers, substantially as described.

40 3. In combination, a lever fulcrumed between its extremities, and having one extremity operatively connected with the exhaust valve of one cylinder of an explosive engine, and its opposite extremity in operative relationship with one extremity of a second lever similarly fulcrumed; a spring having one extremity attached to said lever, and the other to the stem of the exhaust valve of a second engine cylinder and adapted,
 45 ed, when compressed, to close said exhaust valves, with means for giving motion to said system of levers, and a link connecting said means with said second lever, substantially as described.

55 4. In combination, two levers fulcrumed between their extremities and having their contiguous extremities mounted upon the exhaust valve stem of a gas engine, a spring adapted to press said contiguous extremities
 60 against said valve stem, and said levers together, with means for giving motion to said levers, substantially as described.

5. In combination, two levers fulcrumed between their extremities and having their
 65 contiguous extremities mounted upon the

exhaust valve stem of a gas engine, the opposite extremity of one of said levers operatively connected to the exhaust valve of a gas engine cylinder, and the opposite extremity of the other lever connected to means
 70 for giving motion to said levers, with a spring adapted to press the contiguous extremities of said levers against the exhaust valve stem upon which they are mounted, substantially as described.

75 6. In combination, two levers fulcrumed between their extremities and having their contiguous extremities in operative relationship with the exhaust valve stem of a gas engine, the opposite extremity of one of said
 80 levers operatively connected to the exhaust valve of a gas engine cylinder, and the opposite extremity of the other lever connected to means for giving motion to said levers, a spring adapted to press the contiguous
 85 extremities of said levers against the exhaust valve stem upon which they are mounted, with means for adjusting said fulcrums, substantially as described.

90 7. In combination, a lever fulcrumed between its extremities, and having one extremity operatively connected with the exhaust valve of a gas engine, and its opposite extremity in operative relationship with one extremity of a second lever, similarly fulcrumed, means for adjusting said
 95 fulcrums, a spring having one extremity attached to the said lever and the other to the stem of the exhaust valve of a second engine cylinder in such a manner that when the
 100 spring is compressed, its effect will be to raise the second exhaust valve, with means for giving motion to said system of levers, and a link connecting said means with said second lever, substantially as described.

105 8. In combination, two levers fulcrumed between their extremities, and having their contiguous extremities mounted upon the exhaust valve stem of a gas engine, a spring adapted to press said contiguous extremities
 110 and the valve stem upon which they are mounted together, and means for connecting the valve stem upon which they are mounted to said spring, substantially as described.

115 9. In combination, two levers fulcrumed between their extremities and having their contiguous extremities mounted upon the exhaust valve stem of a gas engine, and the outer extremity of one of the said levers operatively connected to the exhaust valve of a
 120 gas engine, a spring adapted to press said contiguous extremities and the valve stem upon which they are mounted together, and means for connecting the valve stem upon
 125 which they are mounted with said spring, substantially as described.

10. In combination, a cam in operative relationship with the shaft of a gas engine, and a cam slide, adapted to be operated by
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said cam with two levers adapted to close the exhaust valve of two cylinders of a gas engine by compressing a spring attached to one of said levers and connected with the stem of one of said valves, substantially as described.

11. In combination, a cam-slide having bosses thereon, with recesses in said bosses adapted to nearly surround friction rollers mounted thereon, and a cam of such a form that two points of its circumference will always be in contact with said friction rollers, with a system of levers for operating the exhaust valves of two gas engine cylinders, and means for connecting said system of levers with said cam-slide, substantially as described.

12. In combination, in an explosive engine a cam slide having a slot in its center adapted to receive the cam shaft and being provided with bosses on said slide having recesses in them adapted to receive and nearly, but not quite surround friction rollers mounted therein, and friction rollers mounted in said recesses with a single cam adapted to give motion to said slide.

13. In combination, in an explosive engine a cam slide having a slot in its center adapted to receive the cam shaft and being provided with bosses on said slide having recesses in them adapted to receive and nearly, but not quite surround friction rollers mounted therein, and friction rollers mounted in said recesses with a single cam, adapted to give motion to said slide, of such

form that both of said friction rollers will continually be in contact with said cam.

14. In combination, a plurality of cam slides angularly positioned with reference to each other, friction rollers on each of said cam slides, and a cam of such form that all of said friction rollers will always be in contact with said cam, with a system of levers connected with each of said cam slides, each of said levers being adapted to operate the exhaust valves of a plurality of cylinders of an explosive engine, and means for connecting each of said systems of levers with its cam slide, substantially as described.

15. In combination, a plurality of cam slides angularly positioned with reference to each other, each of said cam slides having bosses formed thereon, adapted to receive friction rollers, friction rollers mounted in said bosses, and a cam of such form that all of said friction rollers will always be in contact with said cam, with a system of levers connected with each of said cam slides each of said levers being adapted to operate the exhaust valves of a plurality of cylinders of an explosive engine, and means for connecting each of said systems of levers with its cam slide, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

JESSE B. BROWN.

Witnesses:

LILLIAN SHAFER,
MARY S. COBB.