No. 670,060.

Patented Mar. 19, 1901.

H. M. QUICK.

GASOLENE MOTOR.

(Application filed Aug. 27, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

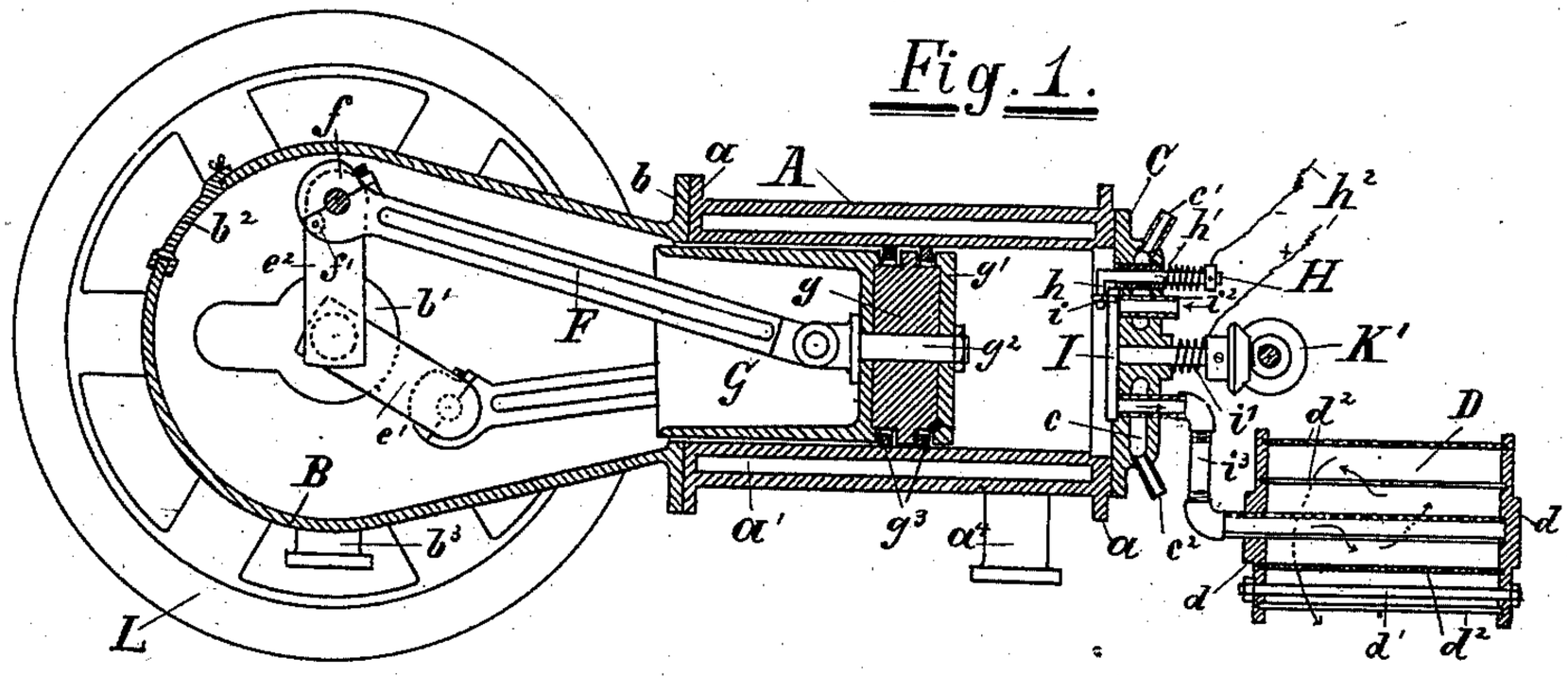
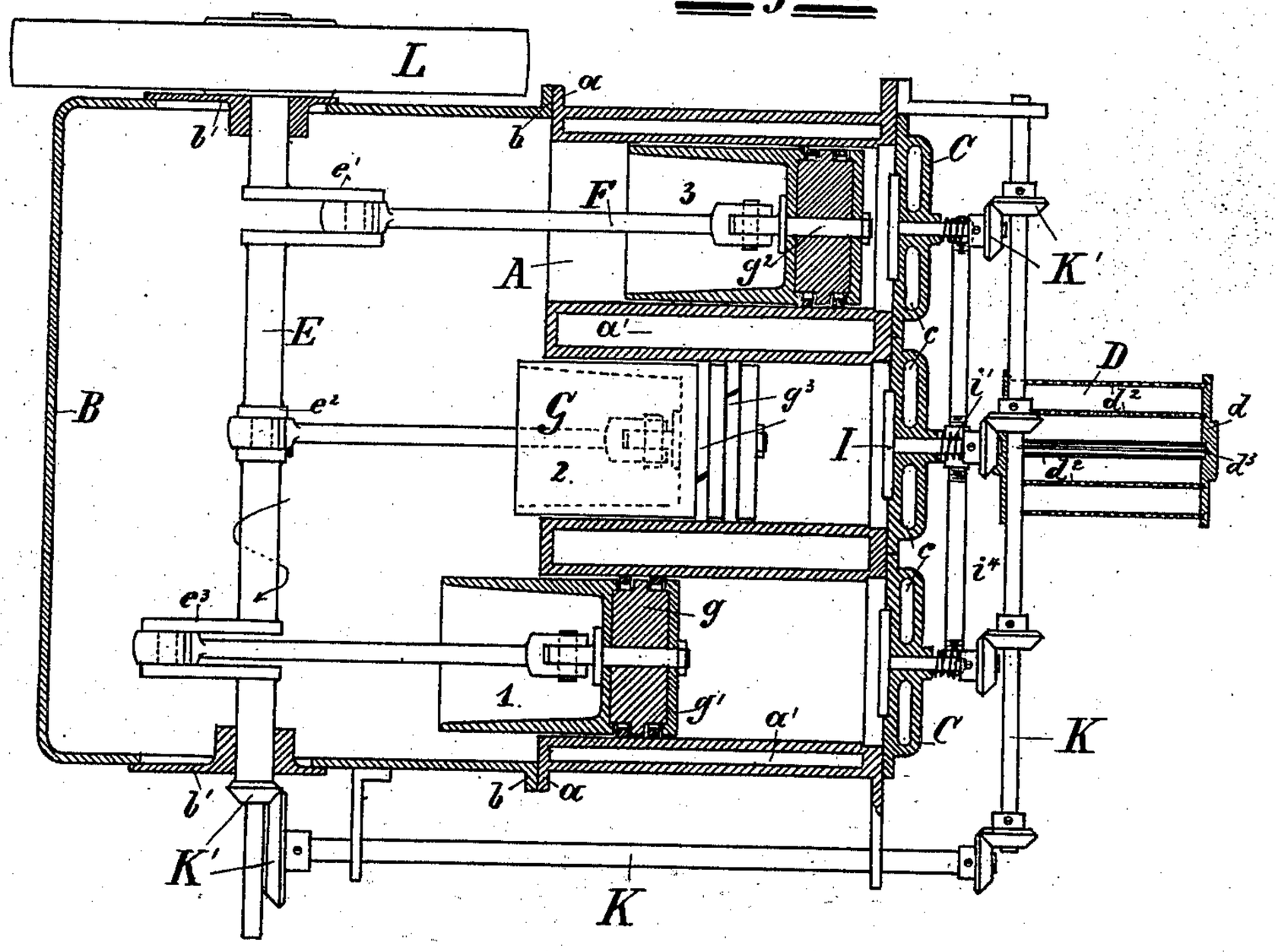


Fig. 2.



WITNESSES:

H. W. Maguire

C. H. Baldwin

INVENTOR.

Hiram M. Quick

BY John T. Kerr

ATTORNEY.

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3 Sheets—Sheet 2.

Fig. 3.

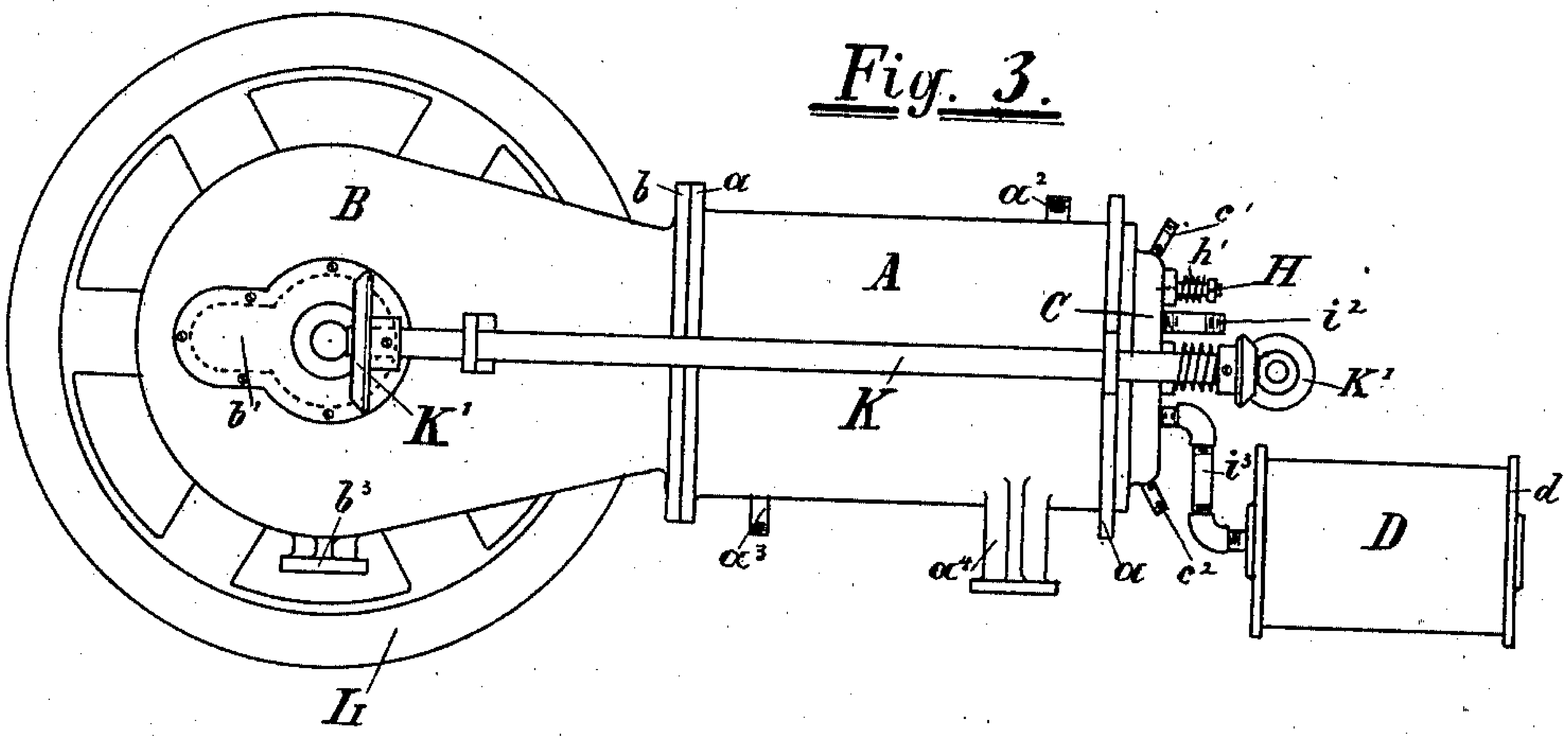


Fig. 4.

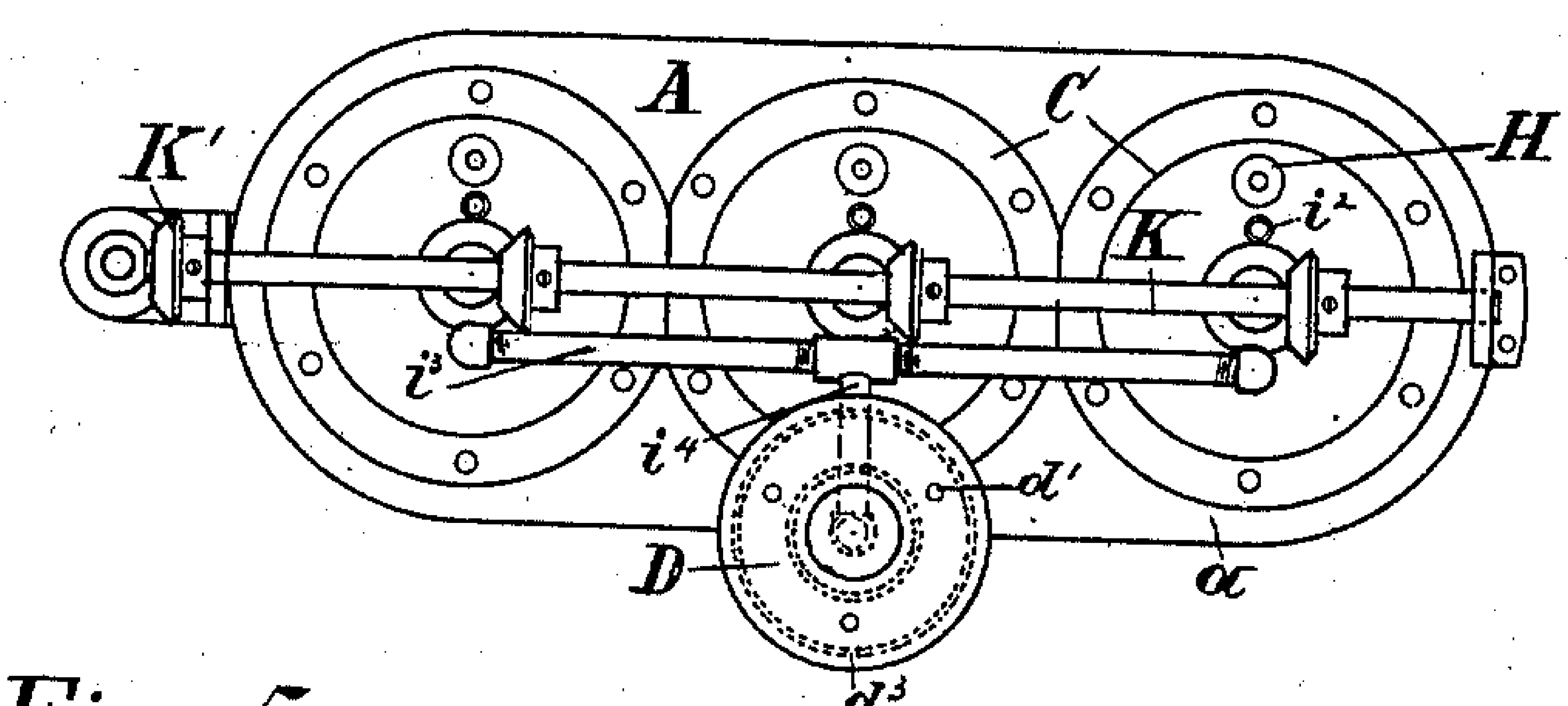
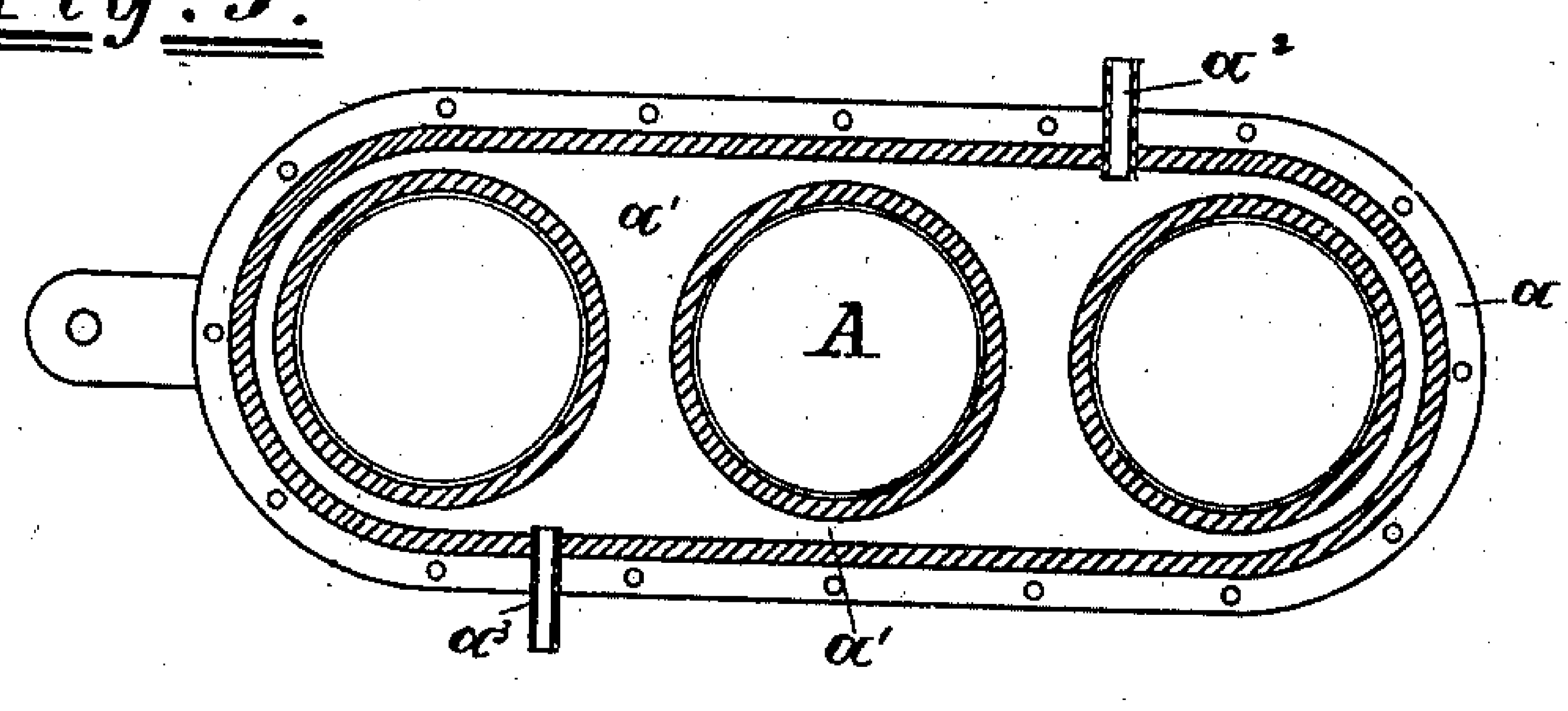


Fig. 5.



WITNESSES:

INVENTOR.

Hiram M. Quick

BY John F. Kerr

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 670,060. Patented Mar. 19, 1901.

H. M. QUICK.

GASOLENE MOTOR.

(Application filed Aug. 27, 1900.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 6.

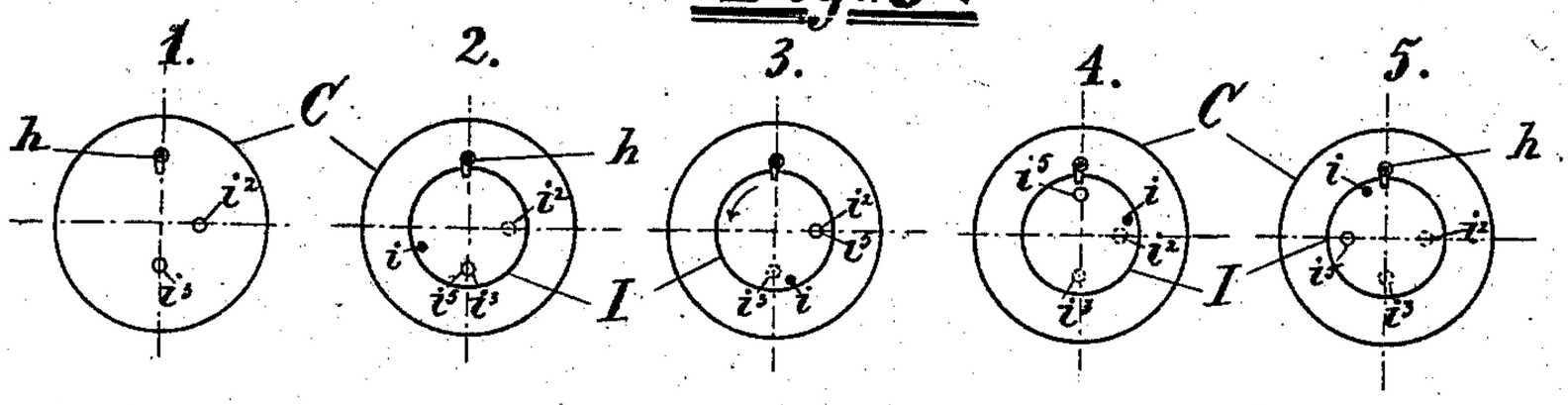
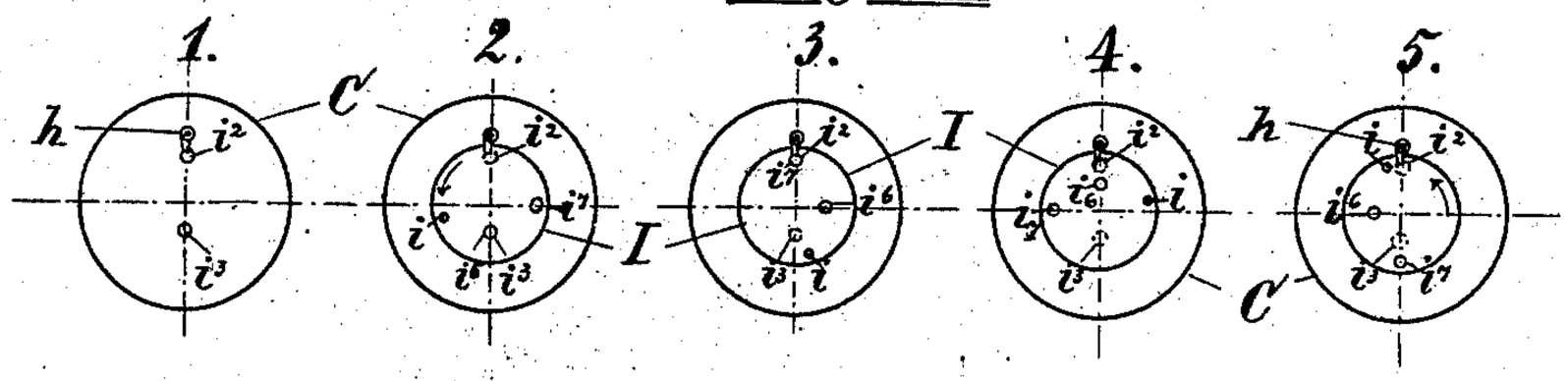


Fig. 7.



WITNESSES:
Geo. Lang.
John. Webster

INVENTOR.
Hiram M. Quick
BY John F. Kerr
ATTORNEY.

UNITED STATES PATENT OFFICE.

HIRAM M. QUICK, OF PATERSON, NEW JERSEY, ASSIGNOR OF ONE-HALF TO HENRY B. KING, OF SAME PLACE.

GASOLENE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 670,060, dated March 19, 1901.

Application filed August 27, 1900. Serial No. 28,103. (No model.)

To all whom it may concern:

Be it known that I, HIRAM M. QUICK, a citizen of the United States, residing at 214 Van Houten street, in the city of Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Gasolene-Motors, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to explosive-engines, and pertains more especially to gasolene-engines, though some of the mechanism and devices are adapted for use in other forms of explosive-engines.

One object of my invention is to provide in an explosive-engine a rotary disk valve adapted to communicate with an inlet-port and an exhaust-port at certain intervals and to engage an igniting device when required, so that in one revolution of the valve the charge will be admitted, exploded, and discharged, and the product of combustion passed off, making way for a new charge explosion and exhaust during the succeeding revolution.

A further object is to diminish, if not obviate, the strain and vibration in an explosive-engine of two or more cylinders.

A further object is to provide a simple and effective means of controlling the admission of a charge, the exploding of the same, and the discharging of the products of combustion in an explosive-engine.

A further object is to so construct a gasolene-engine that it shall be comparatively simple in construction, easy to manipulate, comparatively noiseless, and which shall be effectual in all respects in the performance of its functions.

My improved disk valve and igniter constitute the essential points in my gasolene-engine and may be utilized whether the engine has one or more cylinders.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a longitudinal vertical section of an engine embodying my invention. Fig. 2 is a horizontal longitudinal sectional view of same. Fig. 3 is a side view. Fig. 4 is an end view. Fig. 5 is a cross-sectional view through the cylinder. Fig. 6 shows the relative position of the valve in revolving with the inlet-port and exhaust-port of the cylinder-head. In this figure the inlet-port and the exhaust-port are the same distance from the center, and one opening in the disk valve serves as a communicating means for both the exhaust and inlet ports of the cylinder-head. Fig. 7 is a view showing the cylinder-head having an inlet-port above the center and an exhaust-port below, but nearer to, the center than the inlet-port and the position of the disk valve in revolving. In this case the valve has two openings—one to communicate with the inlet-port and one to communicate with the exhaust-port. If the engine be a two-cylinder engine, the second piston is set to work one-third of the turn of the crank-shaft either earlier or later than the piston of the first cylinder. If there are three cylinders, they are worked one-third of a turn of the crank-shaft apart.

The cylinder portion A and the crank-chamber B of the engine are secured together through the flanges a and b, and between the cylinder-wall and the outside casing are the spaces a' or water-jackets for the circulation of water, a^2 and a^3 being the inlet and outlet for water. The engine stands on the legs a^4 and b^3, and the crank-shaft E is mounted in the bearings b'. The crank-chamber B is provided with a door b^2 to permit the oiling of the crank-shaft and the adjustment of the connecting-rods F. Inside of the cylinder-heads C are the water-spaces c, adapted to be connected with the water-jackets a' by connections c' c^2. The connecting or piston rods F are mounted in the cranks e', e^2, and e^3 of the crank-shaft E. The connecting-rods F are provided with the caps f, having the hinge f'. Said caps are not mounted at right angles to the rod. G is the piston; g, the center part thereof; g', the end of same; g^2, the securing-bolts which hold the parts together, and g^3 cylinder-rings. In Figs. 1 and 2 the cylinders and pistons are constructed as is usual.

The igniter H is held in position by the

spring h' on the igniter-shaft. On the inner end of the igniter-shaft is a crank h, which is provided with any suitable sparking material. A wire h^2 connects with battery and with igniter and valve.

I is my combination feed and exhaust valve and igniting contact, the disk valve having on its face a pin i, which in the revolution of the valve comes in wiping contact with the sparker on the crank end of the igniter-shaft to explode the charge admitted through the inlet-ports in the cylinder-head and valve into the explosion-chamber. The valve is held in its seat by a spring i' on the valve-shaft or by other suitable means. The inlet and exhaust ports in the cylinder-heads are indicated by the letters i^2 and i^3. A pipe i^4 connects outlet and the muffler D. Shafts K connect the valve-shafts and the crank E. Bevel-gears on the valve-shafts, shafts K and crank E meshing to operate the valves from the crank. L is the fly-wheel on the crank E.

As has been already intimated in the description of Figs. 6 and 7, I use one or more openings in my rotary disk valve which are adapted to be the means of communication with the inlet and exhaust ports in cylinder-head. This I claim not to be a departure from the spirit of my invention. When only one communicating opening is employed in the valve, then, as shown in Fig. 6, the inlet-port and the exhaust-port of the cylinder are located ninety degrees apart upon the periphery of a circle which is concentric with the periphery of the valve-shaft, or ninety degrees apart, but equidistant, from a common center. Thus the one opening in the rotary disk valve would register consecutively with the exhaust-port and the inlet-port in cylinder-head. When registering with the inlet-port, the cylinder would be charged at one stroke of the piston, at the next stroke the charge would be compressed and ignited, the explosion driving the piston back, another stroke discharging the products of the explosion as the combined inlet and outlet opening of the valve (in Fig. 6 indicated by i^5) registers with the exhaust-port i^3 of the cylinder, as shown in part 2 of Fig. 6, and the next stroke of the piston would bring the valve-opening i^5 in communication again with the inlet-port i^2 for another charge, as shown in part 3 of Fig. 6.

The approximate position of the contact-pin i on the disk valve is shown in Figs. 6 and 7. The dotted lines crossing each other at right angles divide the circle representing a revolution of the rotary disk valve into quarters, each quarter-revolution representing one stroke of the piston in Figs. 6 and 7. Throughout said figures, i^2 and i^3 represent the inlet-port and exhaust-port, respectively, of the cylinder-head. In Fig. 6 part 1 shows the cylinder-head with the inlet and exhaust ports equidistant from the center and the igniter. Part 2 shows the valve I and cylinder-head, the igniter device overlapping the valve, so as to come in contact with the pin i during the revolution of the valve, the valve-opening i^5 registering with the exhaust-port i^3 in cylinder-head. Part 3 shows the valve-opening i^5 registering with the inlet-port i^2 of the cylinder-head. Part 4 shows both ports closed. The cylinder is compressing until, as part 5 shows, that the charge has been exploded, the pin i having passed the igniting device, and the next stroke of the piston will bring the valve to the position shown in part 2 of Fig. 6, with the valve-opening i^5 registering with the exhaust-port i^3 of the cylinder-head. In Fig. 7 part 1 shows the cylinder-head I and differs from part 1 in Fig. 6 only in this, that the inlet and exhaust ports i^2 and i^3 are differently located, the inlet-port i^2 being above the center and the exhaust-port i^3 below and nearer to the center than the inlet-port. In this figure the valve I is shown to have two openings to communicate with the inlet and exhaust ports, respectively. (See parts 2, 3, 4, and 5 of Fig. 7.) In this modification the communicating openings are indicated, respectively, by i^6 and i^7. In part 2, Fig. 7, the exhaust is open, the opening i^6 of the rotary disk valve registering with the exhaust-port i^3 in the cylinder-head. In part 3 the inlet-port is open and the exhaust is closed, the valve-opening i^7 registering with the inlet-port i^2 in cylinder-head. In part 4 both the inlet and exhaust ports are closed, and at the next stroke of the piston the charge is compressed and fired, both ports being closed, as shown in part 5, the contact-pin i having engaged and passed the igniter h, when the explosion will drive the piston back and the valve will turn another quarter of a revolution, when the valve will be in the position shown in part 1, Fig. 7, the opening in the valve i^6 registering with the exhaust-port i^3 in the cylinder-head, the product of the explosion being discharged through the exhaust.

In the drawings one revolution of the crank-shaft causes the valve to make half a turn, so that there will be four strokes of the piston—two backward and two forward—each revolution of the rotary disk valve. Other arrangements may be made, however, without departing from the scope of my invention.

By setting the several valves the time of the explosion in the several cylinders may be regulated, so that the vibration caused by one may be counteracted by the successive explosions or vibrations caused thereby. Hence I claim that in my invention I reduce the vibration, avoid the sound or clack of valves, muffle the sound of the exhaust, reduce the friction of the piston in the cylinder, and obtain high piston speed, and in my noiseless rotary disk valve I accomplish three important objects—first, control the admission of the charge; second, ignite and explode it after its compression, and, lastly, provide for the discharge of the products of combustion through the exhaust. By the adjustment of the tem-

perature of jacket of water I obtain an economical output of actual power.

With this description of my invention, what I claim is—

1. In an explosive-engine, an explosive-chamber having an inlet-port and an exhaust-port, in combination with an oscillating igniter-shaft having a crank extending into said explosion-chamber, a rotary disk valve controlling both said ports, a contact-pin suitably located on the disk valve and adapted to come in contact during the revolution of the valve with the crank end of the igniter-shaft, and electrical connections between the igniter-shaft and the valve-shaft substantially as set forth.

2. In an explosive-engine, an explosion-chamber in combination with an oscillating igniter-shaft having a crank extending into the explosion-chamber and a rotary disk valve provided with a contact-pin which is integral therewith adapted to engage the crank end or terminal of the igniter-shaft and electrical connections between valve and igniter.

3. In an explosive-engine, an explosive-chamber having an inlet-port and an exhaust-port, in combination with a rotary disk valve having two openings or ports adapted to communicate at certain intervals with said inlet and exhaust ports respectively, said openings or ports in the rotary disk valve being located, the one on an inner and the other on an outer one of two concentric circles, of which the center of the disk valve forms the common center, a contact-pin forming an integral part of said rotary disk valve and an oscillating electrode with which said contact-pin is adapted to come into frictional engagement during the revolution of the rotary disk valve with which it is electrically connected substantially as set forth.

4. In an explosive-engine, the explosive-chamber, in combination with an oscillating igniter-shaft extending into said explosion-chamber, the valve-shaft also extending into said chamber, and a rotary disk valve secured on said valve-shaft, and provided with a pin designed to engage, during the revolution of the disk, with the contact portion on the lower end of said oscillating igniter-shaft, substantially as set forth.

5. In an explosive-engine, the explosive-chamber in combination with an oscillating igniter-shaft extending into said explosion-chamber, the valve-shaft also extending into said chamber, and a rotary disk valve secured on said valve-shaft, and provided with a pin designed to engage during the revolution of the disk with the contact portion on the lower end of said oscillating igniter-shaft, the crank-shaft and connections between said crank-shaft and said valve-shaft, substantially as set forth.

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

HIRAM M. QUICK.

Witnesses:

JOHN F. KERR,

WM. J. ROBERTS.