P. G. CASPIAN.

STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED NOV. 6, 1908.

942.957. Patented Dec. 14, 1909.

Fig. 1.

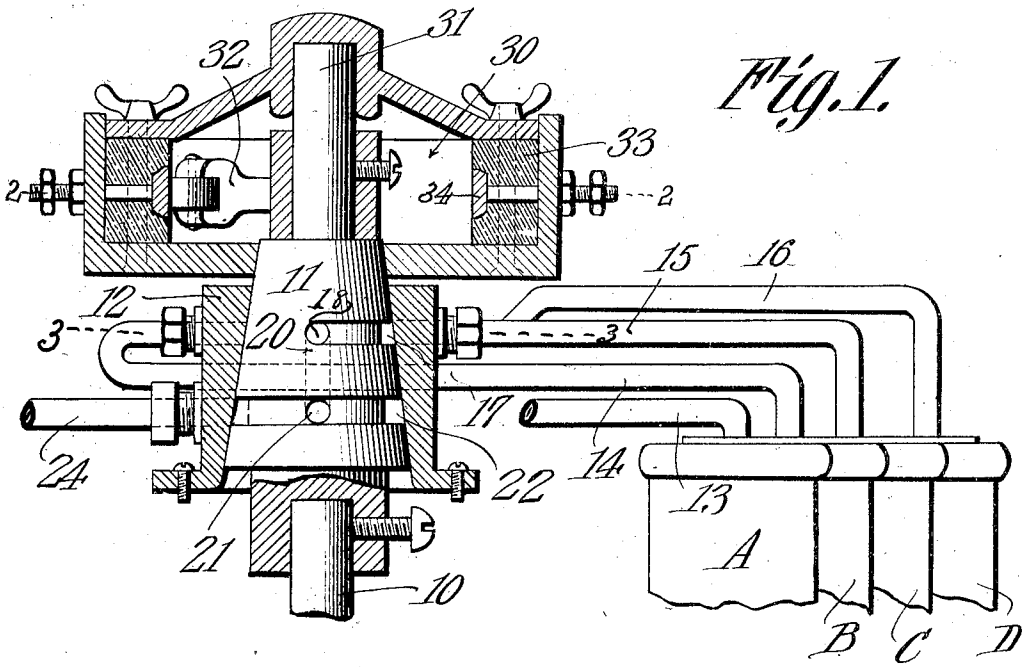


Fig. 2.

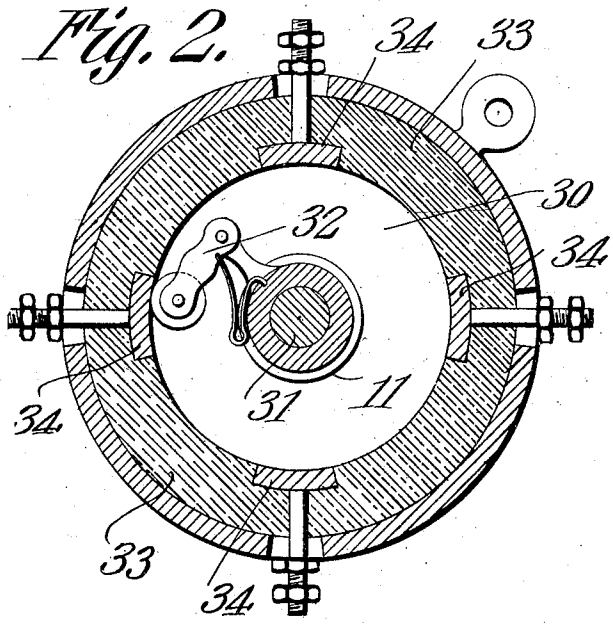
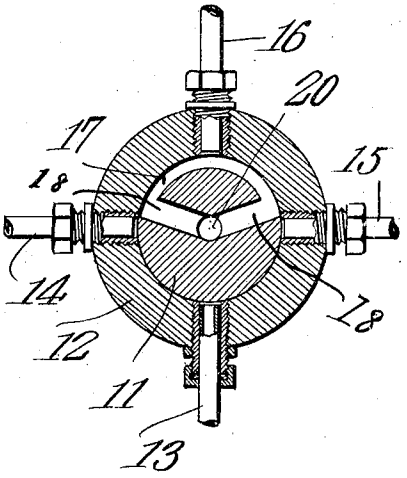


Fig. 3.



Witnesses

E. G. Siggers

Jno. E. Parker

Inventor

Paschal G. Caspian.

By Cushman & Co.

Attorneys

UNITED STATES PATENT OFFICE.

PASCHAL G. CASPIAN, OF CHICAGO, ILLINOIS.

STARTING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

942,957. Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed November 6, 1908. Serial No. 461,390.

To all whom it may concern:

Be it known that I, PASCHAL G. CASPIAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Starting Device for Internal-Combustion Engines, of which the following is a specification.

This invention relates to starting devices for internal combustion engines and has for its principal object to provide a novel means of introducing a charge of explosive compound into one or more of the cylinders of the engine without the necessity of hand cranking.

A further object of the invention is to provide a feeding device through which the charge of explosive compound passes, and to provide means for actuating the feeding device from some movable part of the engine, so that when the engine stops, communication will be established with the proper cylinder or cylinders for the admission of a starting charge or charges.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a sectional elevation of a starting device constructed and arranged in accordance with the invention. Fig. 2 is a sectional plan view of the same on the line 2—2 of Fig. 1. Fig. 3 is a similar view on the line 3—3 of Fig. 1.

Similar characters of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In the ordinary multiple cylinder gas engine, such, for instance, as the four or six cylinder machines used on automobiles and launches, the crank casing is wholly inclosed, and when the engine stops it is practically impossible to determine which of the pistons is in position for an impulse. In the introduction of the explosive charge, it is desirable, of course, that the charge be forced into a cylinder in which the piston is ready for an explosion stroke, or into a cylinder in which the piston is ready for a compression stroke. It is extremely difficult to ascertain which of the cylinders is ready for the introduction of the starting charge, and in carrying out the present invention provision is made for the employment of a continuously operable valve by which the cylinders are consecutively placed in communication with a supply pipe through which an explosive charge may be forced when it is desired to start the engine, the supply being, of course, cut off during the ordinary operation of the engine.

In the device as illustrated in the accompanying drawing, provision is made for supplying four cylinders of an engine, these being designated A, B, C, D.

Mounted on the commutator or timing shaft 10 is the hub of a tapered plug valve 11 that is arranged to revolve within a valve casing 12, and from the upper portion of this valve casing lead four separate pipes 13, 14, 15, 16, to the respective cylinders A, B, C and D. The several ports 18 of the valve casing are arranged to communicate with an arcuate port 17 that is formed in the periphery of the valve, the arcuate port 17 extending through somewhat less than half the circumference of the valve, so that it will communicate with two of the discharge ports, but never more than two ports at the same time. The opposite ends of the arcuate port 17 are extended in on radial lines to a vertically disposed port 20. This port extends axially of the valve and at its lower end communicates through one or more radial ports 21 with a continuous annular groove forming a port 22 in constant communication with a valved supply pipe 24 connected with a carbureter or other suitable source of supply.

The valve is arranged to rotate continuously with the engine, but the controlling valve of the supply pipe 24 is normally closed and is not opened until it is desired to start the engine into operation. The arcuate port 17 is so arranged that it is at all times in communication with those cylinders which are ready for an explosion stroke or a compression stroke, but as soon

as the explosion takes place in one or other of these cylinders, the arcuate port passes out of communication with the corresponding pipe leading to said cylinder and the port is then placed in communication with the next cylinder, so that no matter in what position the engine stops, there will always be free communication between the valve and the two cylinders which are in readiness to be supplied with an explosive charge. It then is simply necessary to open the controlling valve and allow the supply of the explosive charge under any suitable pressure to pass to the proper cylinders, after which the spark timer may be advanced or retarded as necessary for the purpose of producing the initial explosion.

The device as shown in the accompanying drawing is associated with a spark timer 30. The upper of the valve plug is reduced in diameter to form a spindle 31 and to this spindle is secured a revoluble contact arm 32 carrying a roller or brush contact that is arranged to travel in engagement with the inner circular wall of a casing 33 that is supported by the rigid valve casing. The inner wall of the casing 33 is provided with contacts 34 of a number corresponding to the number of cylinders, and the contact is made and broken as the spindle 31 revolves for the purpose of controlling the operation of the engine.

The device may be employed in connection with either two or four cycle engines, and the number of outlet ports of the valve casing is increased or diminished in accordance with the number of cylinders employed.

What is claimed is:—

1. In starting devices for internal combustion engines, a valve plug connected to and operable by one of the engine shafts, a valve casing within which said valve plug is located, connections leading from the valve casing to the several cylinders, each of said connections being disposed in a common plane transversely of the valve casing, an arcuate port formed in the valve plug and arranged to consecutively register with the said connections, a supply port leading to the casing and arranged in a horizontal plane distant from that of the other connections, and a connecting port leading through the valve plug and communicating with the arcuate port.

2. In a device of the class described, a revoluble tapered valve plug, means for securing the same to the timing shaft of the engine, a stationary valve casing within which the plug is located, connections between the valve casing and a supply between the valve casing and the several cylinders of the engine, a spindle extending upward from the valve plug, a revoluble contact arm on said spindle, and a timer casing supported by the valve casing and having contacts with which the spindle carried contact is arranged to engage.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

PASCHAL G. CASPIAN.

Witnesses:
G. F. Conley,
H. C. Gillette.