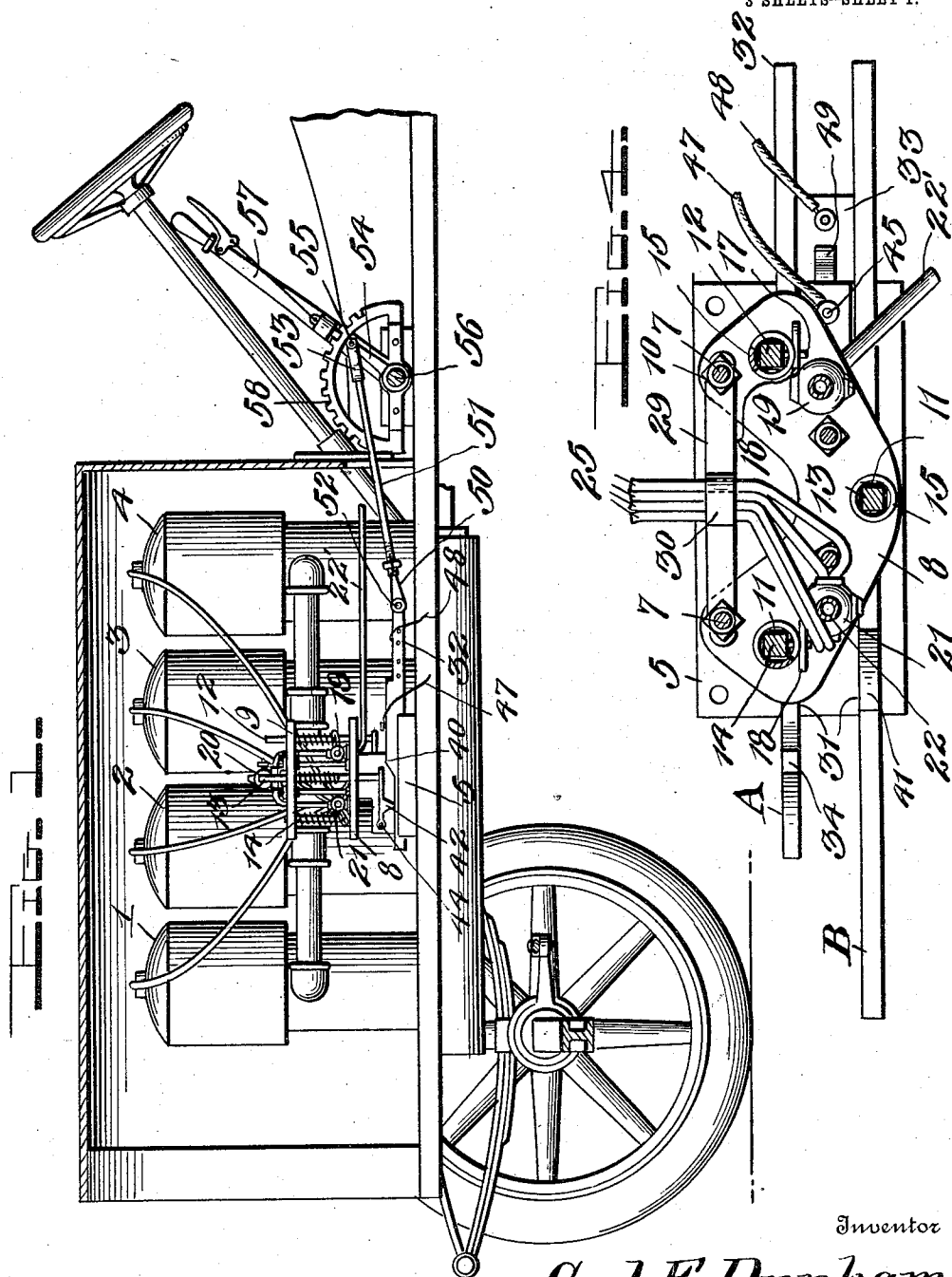


C. E. DUNHAM.
STARTING DEVICE FOR GAS ENGINES.
APPLICATION FILED APR. 18, 1911.

1,022,538.

Patented Apr. 9, 1912.

3 SHEETS—SHEET 1.



Inventor

Carl E. Dunham,

Witnesses

Chas. L. Gristauer.
H. E. Coleman.

By

Watson E. Coleman.

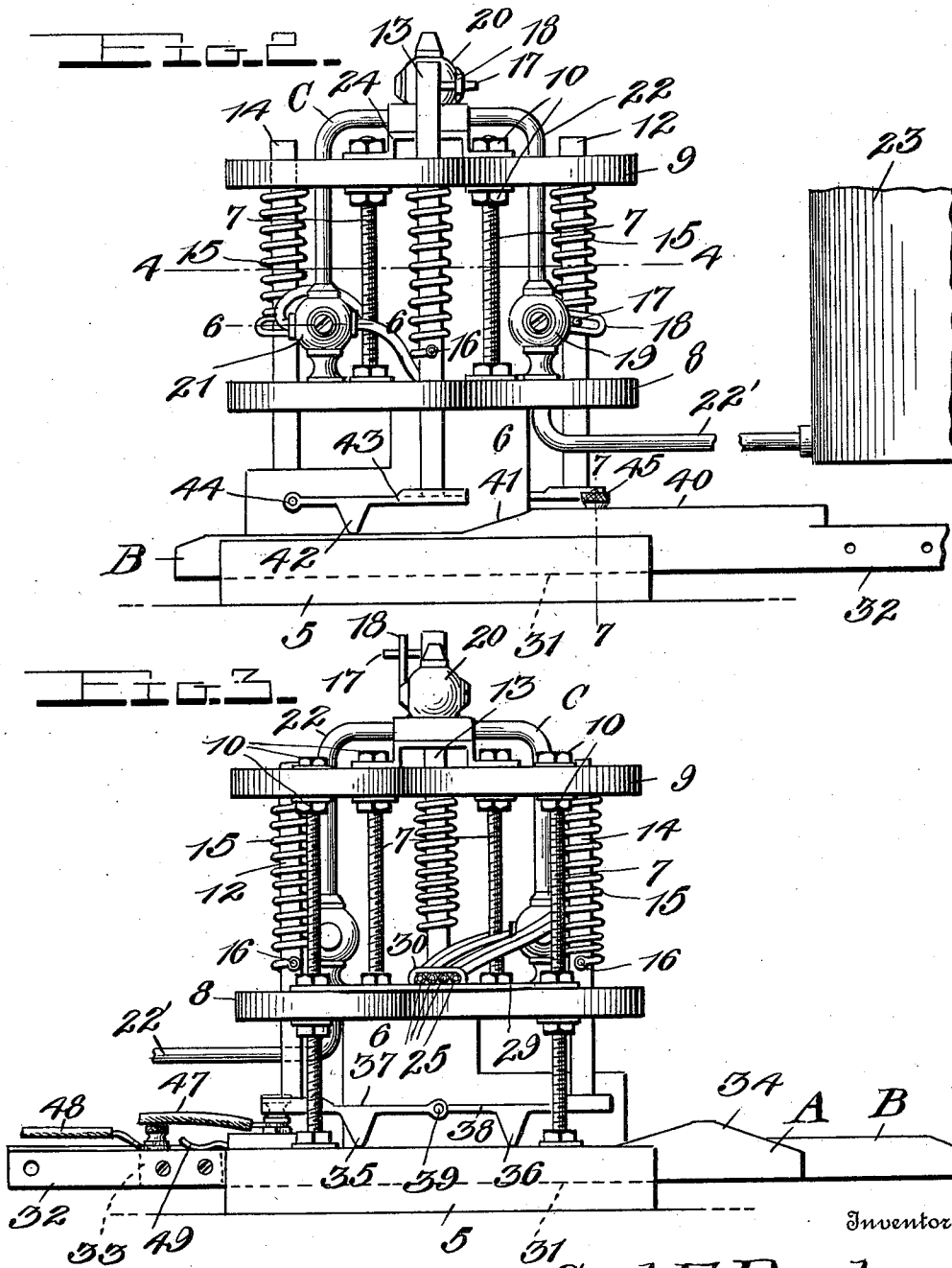
Attorney

C. E. DUNHAM.
 STARTING DEVICE FOR GAS ENGINES.
 APPLICATION FILED APR. 18, 1911.

1,022,538.

Patented Apr. 9, 1912.

3 SHEETS-SHEET 2.



Witnesses

Chas. L. Griebauer.
 H. E. Coleman.

Carl E. Dunham,

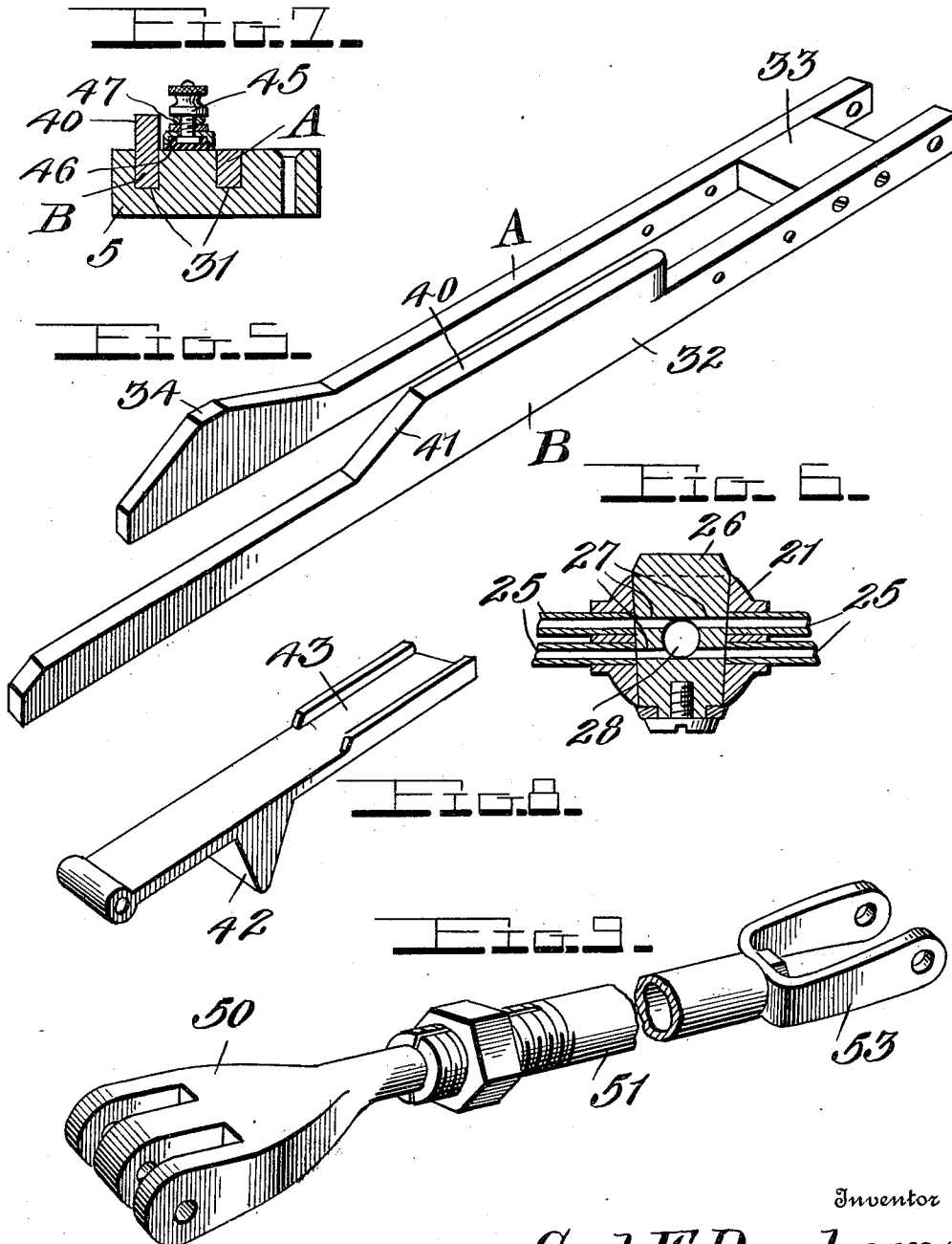
By Watson E. Coleman.
 Attorney

C. E. DUNHAM.
 STARTING DEVICE FOR GAS ENGINES.
 APPLICATION FILED APR. 18, 1911.

1,022,538.

Patented Apr. 9, 1912.

3 SHEETS—SHEET 3.



Witnesses

Chas. L. Griesbauer.
 H. E. Coleman.

Inventor

Carl E. Dunham,

By Watson & Coleman,
 Attorney

UNITED STATES PATENT OFFICE.

CARL E. DUNHAM, OF MADDOCK, NORTH DAKOTA.

STARTING DEVICE FOR GAS-ENGINES.

1,022,538.

Specification of Letters Patent.

Patented Apr. 9, 1912.

Application filed April 18, 1911. Serial No. 621,850.

To all whom it may concern:

Be it known that I, CARL E. DUNHAM, a citizen of the United States, residing at Maddock, in the county of Benson and State of North Dakota, have invented certain new and useful Improvements in Starting Devices for Gas-Engines, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to new and useful improvements in devices for starting gas engines and more particularly to that type using a trembler coil or the jump spark system.

15 It is well known that the present practice of starting gas engines, such as are used for automobiles and the like, is awkward and undesirable, and many inventions have been made for the purpose of doing away with the cranking up of the engines in order to get them started.

The main object of my invention is to provide a device for efficiently accomplishing this result.

25 Another object is to utilize for this purpose a source of energy which is already provided on most automobiles and other motor vehicles.

30 A further object is to provide a starting device which will possess advantages in points of efficiency, durability, is inexpensive of manufacture and at the same time being simple in construction and operation.

35 With the above and other objects in view, the invention consists of the novel features of construction, combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

40 Figure 1 is a side elevation of the forward part of an automobile showing a four-cycle gas engine suitable for use on an automobile with my invention applied thereto; Fig. 2 is a side elevation; Fig. 3 is a similar view from the opposite side from that shown in Fig. 2; Fig. 4 is a horizontal sectional view on the line 4—4 of Fig. 2; Fig. 5 is a detail perspective view of the operating member; Fig. 6 is a section on the line 6—6 of Fig. 2; Fig. 7 is a section on the line 7—7 of Fig. 2; Fig. 8 is a detail view of one of the spring held presser bars; and Fig. 9 is a detail perspective view of the castings secured to the pusher rod.

55 Referring more particularly to the drawings 1, 2, 3 and 4 indicate the four cylinders

of a four-cycle gas engine, mounted on the frame of the automobile and at one side of the engine is my improved starting device comprising a base portion 5 upon which is mounted an upright supporting member 6. Secured in the base are a plurality of supporting rods 7 upon which are mounted the guide members 8 and 9, said guide members being held in position by means of the nuts 10 threaded upon the rods and secured tightly up against each side of the guide members. Slidably mounted in the openings 11 of the guide members are the spring held valve operating rods 12, 13 and 14, said rods having the coiled springs 15 mounted thereon, one end of the spring bearing against the lower side of the upper guide member and the other end secured to the rod as at 16. Securely fixed in the operating rods are the pins 17 running in a guide 18 which is formed on the valves 19, 20 and 21. The valves 19 and 21 are mounted on the lower guide member and connected by the pipe 22. This pipe is bent into U-shaped form as shown at C and passed through openings in the guide member 9 and is supported by said guide member 9. The pipe 22 is connected to a tube or hose 22' which leads from the valve 19 to the acetylene gas tank 23. The valve 20 is located midway between the valves 19 and 21 and acts as an escape device. This valve 20 is mounted on a support 24 secured to the top of the upper guide member 9. Leading from the valve 21 to the cylinders 1, 2, 3 and 4 are four small tubes or hollow wires 25 which convey the gas from the valve 21 to the cylinders. The turning plug 26 of the valve 21 is provided with the four small openings 27 connected with the main opening 28 so that when the valve is open it is open to all four tubes, and when closed it is closed to all four thereby allowing no gas to escape from the cylinders through this valve. The tubes 25 are brought together as they leave the valve 21 and secured to a supporting member 29 fastened across the front side of the lower guide member, the tubes 25 being held onto the support by the clips 30 formed integral with the support.

The base 5 is provided with longitudinal grooves 31 having an operating member 32 slidably mounted therein, said member comprising two arms A and B having their outer ends secured to a steel spacing block 33. The arm A is provided with an engaging

lug 34 adapted to engage the detents 35 and 36 formed on the spring held pressure bars 37 and 38, having one end pivoted to the front side of the supporting member 6 as indicated at 39 and the other ends engaging the lower ends of the rods 12 and 14. The arm B is provided with a raised portion 40 having a forward inclined surface 41 adapted to engage the detent 42 formed integral with the spring held pressure bar 43, said presser bar having one end pivoted to the back side of the supporting member 6 as indicated at 44 and the other end engaging the lower end of the operating rod 13.

Secured to the base and at one end thereof is a battery connection 45 which is insulated from the base as indicated at 46 and is connected to the ground wire of the battery by the wire 47 and to the cylinders by the wire 48. Secured to the connection 45 is a resilient contact point 49 which is adapted to engage the block 33 of the operating member.

Secured to the outer end of the operating member and disposed between the two arms is a casting 50 secured to the end of a pusher rod 51, said casting being fastened to the operating member by means of the bolt 52 passing through the two arms A and B and through the casting. Secured to the outer end of the pusher rod 51 is a U-shaped casting 53 which is pivoted on to the crank arm 54 by means of the bolt 55. This crank arm 54 is rigidly mounted upon the lever rod 56 and said lever rod has a hand lever 57 secured upon its outer end which is adapted to be held in position by the notched segment bar 58.

In starting the engine, the lever 57 is pushed forward by the operator which in turn will slide the operating member 32 forward in the grooves 31 and the lug 34 will tend to engage the detent 35 and force the free end of the presser bar 37 upward and push the valve rod 12 upwardly thus opening the valve 19 and allowing the gas from the tank 23 to pass into the pipe 22, the valve being then closed. As the member 32 is pushed forward the lug 34 will engage the detent 36 and operate the valve 21 in the same manner. This lets the gas which is in the pipe 22 into the cylinders. After the gas has been introduced into the cylinders the member is pushed forward and the detent 42 will engage the raised portion 40 thereby opening the valve 20 which will allow any gas which might be left in the pipe 21 to escape. After the gas has entered the cylinders the operating member 32 is pushed forward until the steel spacing block 33 strikes the contact point 49 which will start a spark in the cylinder, causing an explosion and starting the engine. After the engine is started to stop the same the block 33 is pulled back away from the contact

point 49 so that the spark in the cylinders will discontinue. It will be readily understood that this starting device can be easily modified and used with a six-cylinder as well as a four-cylinder engine without sacrificing any of the novel features.

While I have shown and described the preferred form of my invention, it will be obvious that various changes in the details of construction and in the proportions may be resorted to for successfully carrying the invention into practice without sacrificing any of the novel features or departing from the scope thereof.

Having thus described the invention what is claimed is:—

1. In a device for starting gas engines, the combination with the gas engine, of a tank for gas under pressure, a pipe connecting said tank to the cylinders of the engine, valves arranged in said pipe for closing direct communication between the tank and the engine, manually operated, means for alternately opening said valves, and spring held operating rods for holding said valves in a normally closed position.

2. In a device for starting gas engines, the combination with the gas engine, of a tank for gas under pressure, a pipe connected to said tank for supplying gas to the cylinders of the engine, two valves in said pipe for controlling the admission of gas to the cylinders, one of said valves being secured on the end of the pipe, tubes leading from said last mentioned valve to each of the cylinders of the engine, manually operated means for controlling said valves and admitting gas to the cylinders and electrical connections controlled by said manually operated means for causing a spark after the gas has been admitted to the cylinders to explode the charge.

3. In a device for starting gas engines, the combination of a source of gas pressure, a conductor communicating therewith and with the gas engine, valves arranged in said conductor for closing direct communication between the source of gas pressure and the engine, one of said valves being arranged at the end of the conductor, having tubes connecting said valve to each cylinder of the engine, manually operated means for alternately opening said valves, and spring held operating rods for holding said valves in a normally closed position.

4. In a device for starting gas engines, the combination of a source of gas pressure, a conductor communicating therewith and with the cylinders of the engine, valves arranged in said conductor, means for holding said valves in a normally closed position, manually operated means for alternately opening said valves to admit gas to the cylinders of the engine, and electrical connections controlled by said manually op-

erated means for causing a spark after the gas has been admitted to the cylinders to explode the charge.

5 In a device for starting gas engines, the combination of a source of gas pressure, a conductor leading from said source of gas pressure, a valve arranged in said conductor controlling the admission of gas to a three-way valve located at the end of said conductor, tubes running from said three-way valve to each cylinder and manually operated means controlling said valves for admitting gas to the cylinders of the engine.

6 In a device for starting gas engines, the combination of a source of gas pressure, a conductor therefrom to the cylinders of the engine, manually operated means for controlling said passage to cause the gas to be introduced into the cylinder, a three-way valve arranged at the end of the conductor, tubes leading from said valve to each cylinder of the engine, a valve arranged in said conductor controlling the gas supply, manually operated means for controlling said valves and admitting gas to the cylinders, and electrical connections controlled by said manually operated means for causing a spark after the gas has been admitted to the cylinders to explode the charge.

7 In a starting device for gas engines, the combination of a base portion secured to the frame of a vehicle, vertical rods secured in said base and supporting horizontally arranged guide members, spring held operating rods vertically disposed in said guide members, a conductor mounted on said guide members and leading to a source of gas pressure, valves arranged in said conductor and controlled by said operating rods, and means slidably mounted in said base for operating said rods and controlling the admission of gas to the cylinders of the engine.

8 In a device for starting gas engines, the combination of a base secured to the frame of a vehicle, vertically disposed rods secured in said base, spaced guide members secured on said rods, spring held operating rods vertically disposed in said guide members, a conductor mounted on said guide members and leading to a source of gas pressure, valves arranged in said conductor and controlled by said operating rods, an operating member slidably mounted in said base for actuating said rods, said member being connected to a lever rod, and a hand lever secured on said lever rod for operating said member and controlling the valves arranged in the conductor.

9 In a device of the character described, the combination of a base having an upright supporting member mounted thereon, vertical rods secured in said base, horizontally arranged guide members arranged on said rods, spring held valve operating rods

vertically disposed in said guide members, an operating member slidably mounted in said base, a lug formed on said member for engaging spring held presser feet, said feet having one end pivoted to the upright supporting member, the other end engaging the lower end of the valve operating rods and means connected to said slidably mounted operating member for actuating said valve operating rods and controlling the admission of gas to the cylinders of the engine.

10 In a starting device for gas engines, the combination of a source of gas pressure, a conductor for connecting said source of pressure with the engine, valves arranged in said conductor and controlling the admission of gas to the engine, an escape valve arranged in said conductor between said first mentioned valves and normally held in a closed position, manually operated means for actuating said first mentioned valves and for opening said escape valve and holding the same open while the engine is in motion.

11 In a device of the character described, the combination of a base having vertically disposed rods secured thereto, horizontally arranged guide members secured on said rods, a source of gas pressure connected with the several cylinders of the engine, means mounted on said horizontally arranged guide members for conducting gas from the source of pressure to the cylinders of the engine, and means mounted on said guide members and manually operated for controlling the admission of gas to the cylinders.

12 In a device of the character described, the combination of a base having vertically disposed rods secured in said base, horizontally disposed guide members secured on said rods by having nuts threaded on said rods and disposed on each side of the guide members, spring held valve operating rods vertically disposed in said guide members, said rods being manually operated for actuating valves controlling the admission of gas from a source of supply to the cylinders of an engine and electrical connections controlled by said manually operated means for causing a spark to explode the charge after being admitted to the cylinders.

13 In a device for starting gas engines, the combination of a base having vertically disposed rods secured therein, an upright supporting member secured to said base, horizontally arranged guide members secured on said rods, spring held valve operating rods vertically disposed in said guide members, a source of gas supply, a conductor communicating therewith and with the gas engine, valves arranged in said conductor for controlling the admission of gas to the engine, an escape valve arranged in said conductor between said first mentioned valves, manually operated means for actuat-

ing said first mentioned valves, a raised portion controlled by said means for engaging a spring held presser bar, said presser bar having one end pivoted to one side of the upright member and the other end engaging the lower end of the operating rod which controls the escape valve.

14. In a starting device for gas engines, the combination of a base having an upright supporting member secured thereto, vertically disposed rods secured in said base, horizontally disposed guide members secured on said rods, spring held valve operating rods disposed for vertical movement in said guide members, said rods being connected to valves and adapted to actuate the same for controlling the admission of gas to the cylinders of the engine, grooves formed in said base, a manually operated sliding member operated in said grooves and engaging spring held presser bars pivotally mounted on the upright portion and engaging the

lower end of the valve operating rods for actuating said valves.

15. A device for starting gas engines, means for operating said device, comprising an operating member slidably mounted in grooves formed in a base portion, said member being composed of two arms suitably secured together at one end, the other ends sliding in said grooves and engaging spring held presser bars, a casting secured between the outer ends of the arms of the operating member and connected to a push rod, said push rod being secured to a crank arm mounted on a lever rod, and a hand lever mounted on the end of said lever rod for actuating the operating member.

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

CARL E. DUNHAM.

Witnesses:

A. M. SHEIMO,

WM. JACOBSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."