

R. H. MUNTZ.
 STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED SEPT. 13, 1910.

1,037,653.

Patented Sept. 3, 1912.

3 SHEETS—SHEET 1.

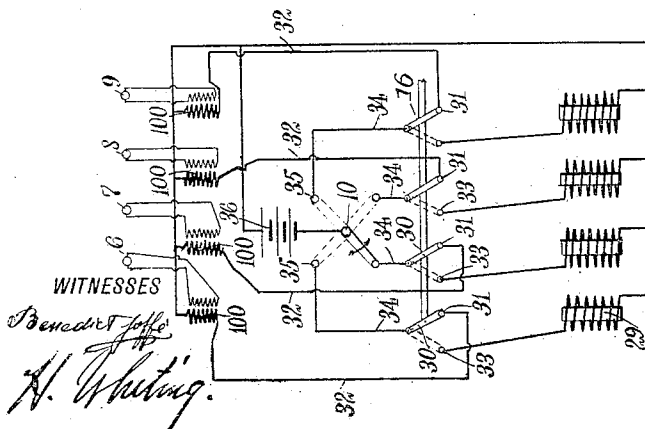
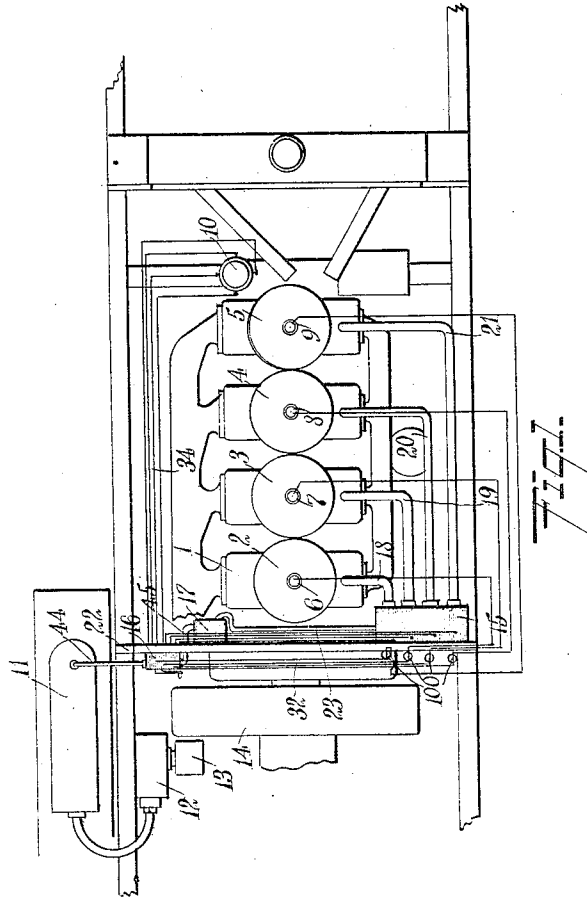


Fig. 2

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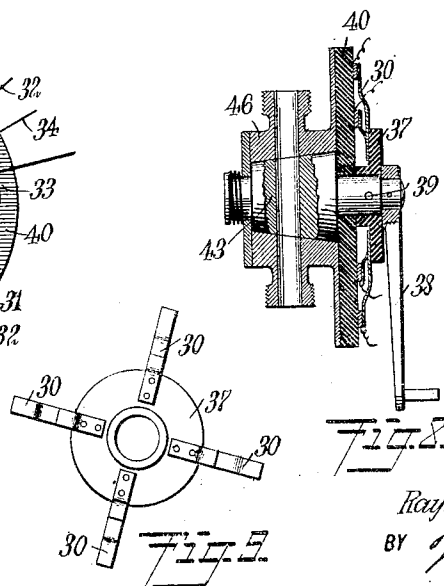
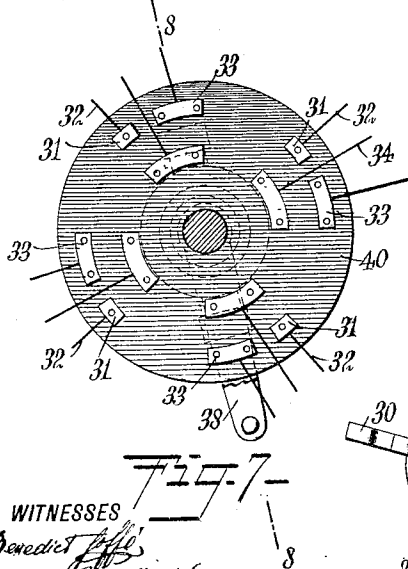
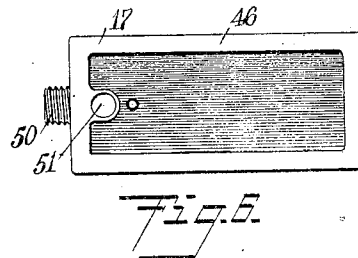
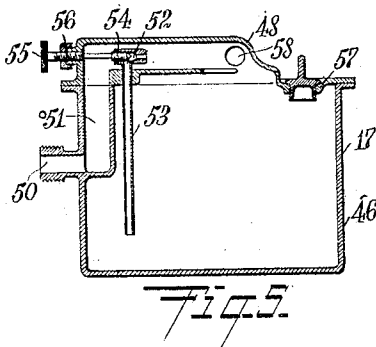
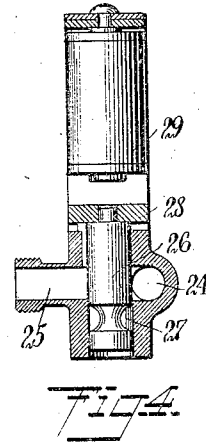
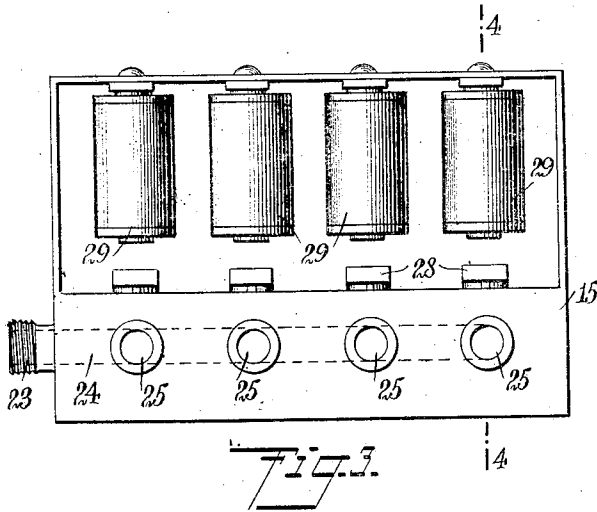
WITNESSES
Benedict J. Joffe
H. Whiting

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2 SHEETS—SHEET 2.



WITNESSES
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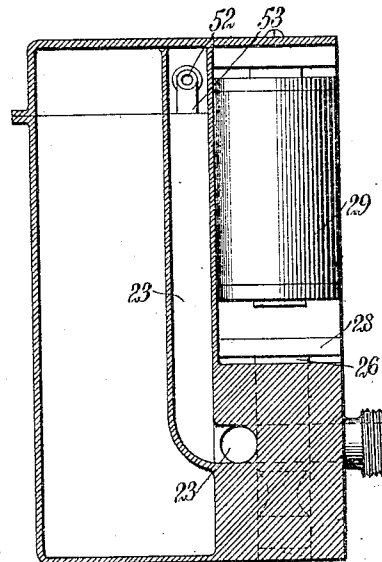
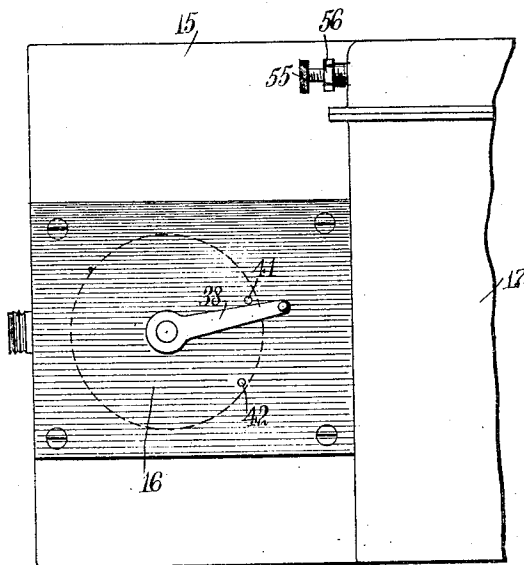
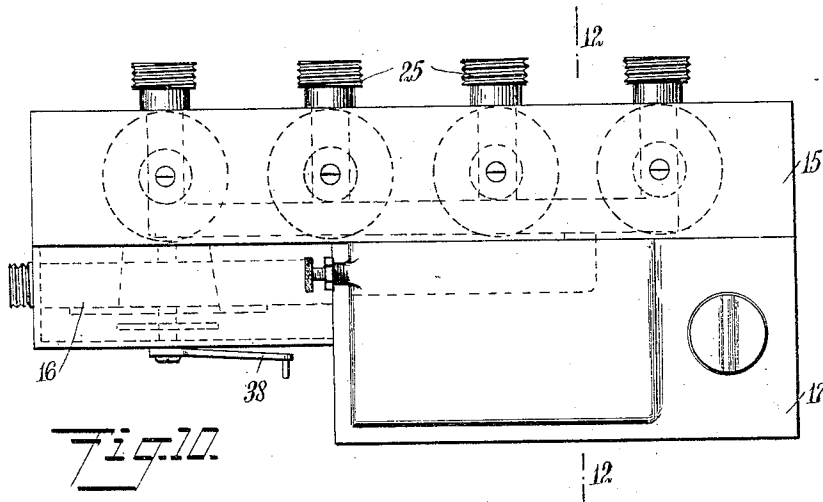
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UNITED STATES PATENT OFFICE.

RAYMOND H. MUNTZ, OF GREENVILLE, PENNSYLVANIA, ASSIGNOR TO GEISZLER
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STARTING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

1,037,653.

Specification of Letters Patent.

Patented Sept. 3, 1912.

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To all whom it may concern:

Be it known that I, RAYMOND H. MUNTZ, a citizen of the United States, and a resident of Greenville, in the county of Mercer and State of Pennsylvania, have invented a new and Improved Starting Device for Internal-Combustion Engines, of which the following is a full, clear, and exact description.

This invention relates to a new and improved device for starting an explosive or internal combustion engine without the necessity of cranking up; that is to say, the operator can start the engine, if it should happen to be attached to an automobile, while sitting in the operator's seat.

An object of this invention is to provide a device in which an explosive charge under pressure will be admitted to the proper one of a plurality of cylinders, in the best position adapted to receive the charge and exert the explosive force in starting the engine.

A further object of this invention is to provide means for storing a fluid under pressure, the admission of which to any one of a plurality of engine cylinders is controlled by a controller, which in turn is rendered active by a starter.

These and further objects, together with the construction and combination of parts, will be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a top plan view showing one arrangement of my device, wherein it is attached to an explosive engine on an automobile; Fig. 2 is a diagrammatic illustration showing the connection of the wiring of the electric controlling mechanism; Fig. 3 is a detached view, in elevation, of the selector which admits the explosive charge to the cylinder in the position best adapted to receive it; Fig. 4 is a vertical section on the line 4—4 of Fig. 3; Fig. 5 is a vertical section through the charge former; Fig. 6 is a top plan view of the charge former illustrated in Fig. 5, with the cover removed and the aspirator pipe shown in section; Fig. 7 is a face view of the electrical switch of the starter, with the handle and contacts taken

away, to show the structure; Fig. 8 is a section on the line 8—8 of Fig. 7; Fig. 9 is a face view of the spider arm forming a part of the switch of the starter; Fig. 10 is a top plan view of another arrangement of my device, showing the elements thereof in compact form; Fig. 11 is a face view in elevation of the form shown in Fig. 10; and Fig. 12 is a vertical section on the line 12—12 of Fig. 10.

Referring more particularly to the separate parts of the device, 1 indicates a suitable internal combustion or explosion engine, which may consist of any number of cylinders 2, 3, 4 and 5. The exhaust inlet and sparking arrangements of these cylinders may be of any suitable character. For the purpose of igniting the charge in the cylinders, however, they are preferably provided with spark plugs 6, 7, 8 and 9, which are connected, by suitable wiring, to the secondary windings of individual spark coils 100, the latter being connected in a manner to be described, to a timer 10. The charge to be supplied to the cylinders in the initial starting of the same may be supplied directly from a suitable storing tank 11, such as a presto-light tank, but in this instance I have shown the tank as being simply a storing tank for storing a supply of compressed air, which is accumulated by means of a suitable pump 12, actuated from the power shaft, which the engine 1 drives in any suitable manner, as by means of having a friction gear 13 engage the surface of the fly-wheel 14. In the arrangement illustrated, the supply of compressed air is carried to a selector 15 through a starter 16 and a vaporizer or charge-former 17, by means of suitable conduits. From the selector 15, the charge formed in the charge former is supplied to the cylinders 2, 3, 4 and 5 by means of pipes 18, 19, 20 and 21, which let into the chamber within the cylinders in any suitable manner.

In the arrangement shown in Fig. 1, the starter 16, the charge former 17 and the selector 15 are separated somewhat from each other and scattered along both sides of the dashboard of the automobile, indicated at 22. This arrangement is used when there is not sufficient room for the compact form illustrated in Fig. 10.

In the form illustrated in Fig. 10, the selector, charge former and starter are arranged together in one compact unit, which may be secured to the face of the dashboard directly in front, or near the operator.

Any other suitable arrangement may be used without departing from the scope of the invention.

By reference to Figs. 3, 4 and 10, one form of selector which I may use is shown. In this case, it will be shown that the conduit indicated by the reference numeral 23, leading from the charge former 17 supplies the charge to a passage 24, which has a plurality of outlets 25 communicating with the passage 24 and supplying the pipes 18 to 21. Each of these outlets 25 is controlled by a valve 26, which may be of any suitable form, and in this case, is shown in the form of a cylinder slidingly mounted in such a manner that it will move vertically, and is provided with a groove or opening 27 therein, which is adapted to be brought into alinement with the outlet 25 and the passage 24, so as to open up the communication therebetween. In order to operate each of these valves 26, they are each provided with an armature 28, which is disposed in co-operative relation, preferably in this case below the pole of a magnet 29, which may be either a single or a double magnet or of any suitable form. It will be seen that there is a magnet for each of the valves, so that each valve is capable of independent operation. For the purpose of controlling these magnets, they are each connected, as will be seen by reference to Fig. 2, to the selector 16, the selector switch in this case being shown diagrammatically in the form of a plurality of arms 30, which are adapted to be thrown simultaneously from one side of the contacts indicated by the numeral 31, which are connected by individual wires 32 to the spark coils 100, to engagement with contacts 33, which are individually connected to the separate magnets 29. The opposite ends of these arms 30 are connected electrically by individual wires 34 to the brush contacts 35 forming a part of the timer 10, which in turn is connected to a suitable source of electricity indicated by the battery 36. The far side of the battery 36 is connected by suitable conducting wires to the opposite side of the spark coils 100, and also to the opposite side of the magnets 29. It will thus be seen that by throwing the arms 30 of the switch, the electrical connection can be shifted from a complete circuit through the timer, the source of electricity and the spark coil to a complete circuit through the timer, the source of electricity and the magnets, so that the spark coils can be thrown out of action and the selector thrown into action, and vice versa.

The illustration in Fig. 2 is merely dia-

grammatic, and any suitable form of switch may be used. One form which I have found feasible is disclosed in Figs. 7 to 9. In this case, the contacts and arms are indicated by the same numerals as in Fig. 2. The arms are preferably arranged to form a spider connected to a suitable insulating hub 37, which is operated by any suitable means, such as a hand crank 38 on a shaft 39. The contacts are embedded in a suitable insulating disk 40 in such a position that they will be readily engaged by the arms 30, so as to complete the circuit therebetween.

As will be seen by reference to Fig. 11, the hand crank may be limited in its motion by suitable stops 41 and 42, whereby the arms 30 may be accurately positioned in co-operative relation with either the contacts 31 or the contacts 33.

It has been found feasible to control the admission of the starting fluid under pressure simultaneously with the control of the selector 15. An arrangement which will effect this result is shown in Fig. 8, where the shaft 39 which carries the switch arm also operates a valve 43, which controls the flow of fluid, under pressure, from the tank 11 to the charge former 17. For this purpose, it is merely necessary to connect the tank 11 and the charge former 17, by means of suitable conduits 44 and 45, to opposite sides of the valve casing, indicated at 46, of the valve 43. It will thus be seen that by merely throwing the hand crank 43, the valve 43 will be opened, and at the same time, the source of electricity 36 will be connected up through the timer and the selector 15.

The form of the charge former 17 may be of any suitable character. In Figs. 5 and 6, I have disclosed one form, which appears to be particularly applicable. In this case, it consists of a tank 47, having a cover 48, which is adapted to be secured thereto, preferably in a fluid-tight manner. The conduit 45 is connected to this charge former at an inlet 50, which communicates with a passage 51, whereby the fluid, such as air under pressure, flows past a spraying nozzle 52, which is connected by means of a pipe 53 to the supply of combustible fluid, such as gasoline, in the tank 46. This sprayer 52 and the pipe 53 form an aspirator, inasmuch as the gasoline is drawn up by the flow of air past the outlet thereof. The amount of gasoline which this aspirator sprays into the passing stream of air may be regulated by a valve 54, which is controlled by a suitable thumb screw 55, and has a suitable screw-threaded connection with the casing of the charge former, as at 56.

It will be noted that the top or cover of the charge former is preferably depressed at one point, indicated at 57, and that the sup-

ply opening is located at this point. The object of this is to prevent the charge former from being filled so full as to flood the upper part of the passage 51, where the charge-forming action takes place. The mixture of vaporized gas and air passes out through a suitable outlet 58 into the conduit 23, from whence it travels to the selector 15.

The operation of the device will be readily understood when taken in connection with the above description. With this arrangement on an automobile, the operator does not have to crank up when starting, nor does he have to depend on the cylinders of the engine possibly retaining a compressed charge. When the operator desires to start, it is merely necessary to throw the crank 38 from the position in which the switch arms 30 engage the contacts 31, to a position in which they engage the contacts 33, thus cutting the spark coil out of connection with the timer 10 and the source of electricity 36, and throwing the magnets 29 into circuit with the timer 10 and the source of electricity 36. The timer now controls the magnets 29, so as to excite the proper one which corresponds to the proper cylinder in condition to receive the spark, so that the proper magnet will open its valve 26, allowing the compressed charge from the charge former 17 to pass into the proper cylinder. It is to be noted that simultaneously with the connection of the contacts by the throwing of the arm of the crank 38, that the valve 43 was opened so that the fluid under pressure passed from the tank 11 into the charge former 17. When sufficient time has elapsed for the charge to have passed into the cylinder ready for it, the crank 38 can be thrown back into its original position, so as to connect the timer and the source of electricity with the spark coil. When this has been done, the cylinder which has received the charge will have its spark plug rendered active, so that the charge therein will be ignited and the engine started. It will thus be seen that the selector and the timer taken together form controlling mechanism or a controller which regulates the supply of the charge to the proper cylinders.

While I have shown two embodiments by my invention, I do not wish to be limited to the specific details thereof, but desire to be protected in various changes, modifications and alterations which may come within the scope of the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. The combination with an engine having a plurality of cylinders, of means for starting said engine comprising a selector for controlling the flow of explosive charges to the cylinders of said engine, an ignition means for exploding the charges in said

cylinders, a timer for controlling said ignition means, electrical means for operating said selector, a source of electricity, a switch for alternately throwing said source of electricity and said timer into operative connection with said ignition means and said selector, a charge former for supplying the explosive charge to the selector, and a valve for controlling the operation of said charge former, connected to said switch and adapted to be operated thereby.

2. The combination with an engine having a plurality of cylinders, of means for starting said engine, comprising a selector for controlling the flow of explosive charges to the cylinders of said engine, an ignition means for exploding the charges in said cylinders, a timer for controlling said ignition means, electrical means for operating said selector, a source of electricity, a switch for alternately throwing said source of electricity and said timer into operative connection with said ignition means and said selector, a charge former for supplying the explosive charge to the selector, a valve for controlling the operation of said charge former, and connections between said valve and said switch, whereby said valve and said switch may be operated simultaneously.

3. The combination with an engine having a plurality of cylinders, of means for starting said engine, comprising a selector for controlling the flow of explosive charges to the cylinders of said engine, an ignition means for exploding the charges in said cylinders, a timer for controlling said ignition means, electrical means for operating said selector, a source of electricity, a switch for alternately throwing said source of electricity and said timer into operative connection with said ignition means and said selector, a charge former for supplying an explosive charge to said selector, a tank for supplying a compressed fluid to said charge former, and a valve for controlling the supply of fluid from said tank to said charge former.

4. The combination with an engine having a plurality of cylinders, of means for starting said engine comprising a selector for controlling the flow of explosive charges to the cylinders of said engine, an ignition means for exploding the charges in said cylinders, a timer for controlling said ignition means, electrical means for operating said selector, a source of electricity, a switch for alternately throwing said source of electricity and said timer into operative connection with said ignition means and said selector, a charge former for supplying an explosive charge to said selector, a tank for supplying a compressed fluid to said charge former, a valve for controlling the supply of fluid from said tank to said charge former, and connections between said switch

and said valve, whereby said switch and said valve are adapted to be operated simultaneously.

5 5. The combination with an engine having a plurality of cylinders, of means for starting said engine comprising a selector for controlling the flow of explosive charges to the cylinders of said engine, an ignition means for exploding the charges in said cylinders, a timer for controlling said ignition means, electrical means for operating said selector, a source of electricity, a switch for alternately throwing said source of electricity and said timer into operative connection with said ignition means and said selector, a charge former for supplying an explosive charge to said selector, a tank for supplying a compressed fluid to said charge former, a valve for controlling the supply of fluid from said tank to said charge former, and a pump driven by said engine for supplying the compressed fluid to said tank.

6. The combination with an engine having a plurality of cylinders, of means for starting said engine, comprising a selector for controlling the flow of explosive charges to the cylinders of said engine, an ignition means for exploding the charges in said cylinders, a timer for controlling said ignition means, electrical means for operating said selector, said timer controlling said electrical means, a source of electricity, a switch for alternately throwing said source of electricity and said timer into operative connection with said ignition means and said selector, a charge former for supplying

an explosive charge to said selector, a tank for supplying a compressed fluid to said charge former, a valve for controlling the supply of fluid from said tank to said charge former, and a pump driven by said engine for supplying the compressed fluid to said tank.

7. The combination with an engine, comprising a plurality of cylinders, of means for starting said engine, comprising a charge former, a selector for controlling the flow of charges from said charge former to said cylinders, said selector comprising a casing having a passage therein, a plurality of outlets for said passage, a vertically-movable valve, having a groove therein, for controlling the communication between each of said outlets and said passage, each of said valves having an armature, a magnet for each of said armatures, a source of electricity adapted to excite said magnets, a timer for selectively controlling the supply of electricity from said source to said magnets, a switch for controlling the supply of electricity from said source of electricity, a valve for controlling the supply of fluid under pressure to said charge-former, and means for simultaneously operating said last-mentioned valve and said switch.

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

RAYMOND H. MUNTZ.

Witnesses:

HORATIO WHITING,
PHILIP D. ROLLHAUS.

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