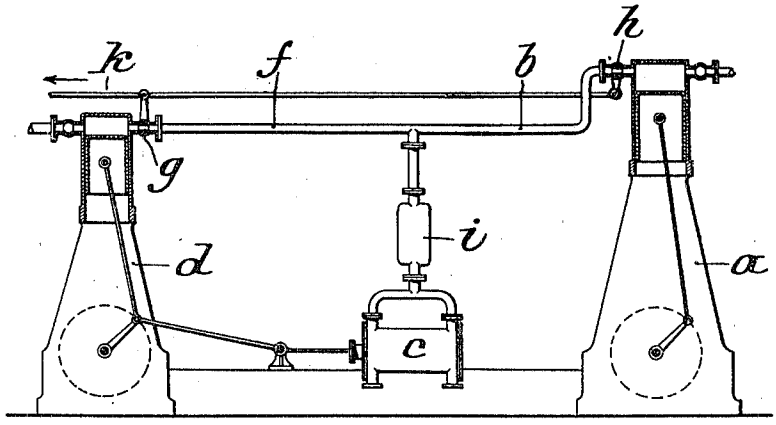
T. REUTER.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED NOV. 14, 1910.

1,008,863. Patented Nov. 14, 1911.



WITNESSES

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INTERNAL-COMBUSTION ENGINE.

1,008,863. Specification of Letters Patent. Patented Nov. 14, 1911.

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To all whom it may concern:

Be it known that I, THEODOR REUTER, a citizen of the Swiss Republic, residing at Winterthur, 24, Obere Wielandstrasse, Switzerland, have invented certain new and useful Improvements in or Relating to Internal-Combustion Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to internal combustion engines of the known type in which the charge is compressed before being admitted to the engine cylinder, by means of a separate pump driven by an internal combustion engine independent of the main engine.

When the auxiliary or charging engine is itself of the same type as the main engine it in turn requires a separate charging pump, or in the alternative has to work on a different system from that of the main engine. According to this invention these disadvantages are avoided by making a single charging pump supply the working cylinders both of the main and the auxiliary or charging engines and regulating the output of the charging pump simultaneously and jointly in both the main and auxiliary engines by suitably dividing the supply of air delivered. In that way it is no longer necessary to have a separate charging pump for the auxiliary engine, and both internal combustion engines can work on the same system.

In the accompanying drawing, which shows diagrammatically an application of the invention, *a* is the main engine which receives its charge of compressed air or compressed air and gas, through the pipe *b* from the air or working charge pump *c*. The latter is coupled to the auxiliary engine *d* which receives its charge from the same pump *c* by way of the connecting pipe *f*. The pump *c* can have one or more stages, it can pump air alone, or air and fuel, either separately or as a mixture. The internal combustion engines *a* and *d* can have one or more cylinders, single or double acting, and work on the two stroke or four-stroke cycle. Further, they can, if desired, be arranged in different relations without departing from this invention. It is however preferable to arrange them separately, as in that case the work of the main engine *a* can be regulated by altering the number of revolutions of the auxiliary engine *d*.

In the arrangement described control is effected by varying the output of the charging pump by simultaneously regulating the charge to both internal combustion engines.

The embodiment shown in the drawing comprises inlet valves *g*, *h* associated with the cylinders of the auxiliary and main engines respectively, which valves regulate the quantity of fluid motive agent passing from the pump chamber *i* through the pipes *f*, *b*, respectively. These valves are shifted simultaneously by means of a rod *k*, and if said rod is moved in the direction of the arrow the valves *g*, *h* will be moved from the open position shown into a closed position, wherein they cut off communication between the pump and the respective engines. It will thus be evident that both valves may be operated similarly and simultaneously by the same operating mechanism, but it must be understood that both the character of the admission or distributing devices *g*, *h* and the form of the operating means therefor are susceptible of wide variation without departure from the invention. It is manifest, as previously stated, that these admission devices only regulate the quantity of fluid medium flowing through the connecting pipes, and it will be understood that the distribution of such medium in the respective engine cylinders is effected by the distributing mechanism usually associated with engines of this type.

If, for instance, the driving engine when used on a vehicle traveling on a gradient requires a great deal of compressed air, the engine driver simultaneously and jointly increases the supply of air to both cylinders, *i. e.* to that of the driving engine as well as to that of the auxiliary engine. It is true the driving engine will then work more slowly, on account of the gradient, but it will develop more power. The auxiliary engine will, however, independently of the main engine, work much more quickly than before on account of the large supply of air and will therefore supply the extra quantity of compressed air both for itself and for the driving engine. The same regulation is effected when the driving engine has for instance to run very quickly on the level. The power required will then be comparatively small, but the air consumption

very great on account of the number of revolutions. In this case, again, by the simultaneous and joint regulation of the air supply to both engine cylinders accurate regulation will be effected during the working without complicated and unreliable auxiliary apparatus, and further an efficient control and instantaneous action of the valve gear will be obtained. The joint and simultaneous regulation of the air supply to both engine cylinders can be effected by means of any mechanism either by hand or automatically.

I claim:—

1. In an internal combustion engine installation, the combination of a main engine, an auxiliary engine, and a charging pump driven by the auxiliary engine and connected with the cylinders of both engines, the supplies of both engines being regulable simultaneously.

2. In an internal combustion engine installation, the combination of a main engine, an auxiliary engine, a charging pump driven by the auxiliary engine to supply fluid medium to both of said engines, and a single means for regulating simultaneously the supply of fluid medium to both engines.

3. In an internal combustion engine installation, the combination of a main engine, an auxiliary engine, a charging pump driven by the auxiliary engine to supply fluid medium to both engines, connections between said pump and the respective engines for the supply of fluid medium, and means associated with said connections for regulating the supply of both engines similarly and simultaneously.

4. In an internal combustion engine installation, the combination of a main engine, an auxiliary engine, a charging pump driven by the auxiliary engine, branch connections leading from said pump to the cylinders of the respective engines, regulating devices in said connections, and a single means to operate said regulating devices.

5. In an internal combustion engine installation, the combination of a main engine, an auxiliary engine, a charging pump driven by the auxiliary engine, branch connections leading from said pump to the cylinders of the respective engines, regulating devices in said connections, and a connection between said regulating devices whereby they are operated similarly and simultaneously.

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

THEODOR REUTER.

Witnesses:
ARTHUR J. BUNDY,
CARL GUBLER.