N° 22,947 A.D. 1905

(*Under International Convention.*)

Date claimed for Patent under Patents Act, 1901, being date of first Foreign Application (in Germany), 9th Nov., 1904

Date of Application (in the United Kingdom), 8th Nov., 1905

Under Section 1 (2) of the Patents Act, 1901, this Specification became open to public inspection at the expiration of twelve months from the date of the application in Germany

Accepted, 10th May, 1906

COMPLETE SPECIFICATION.

Improvements in or relating to the Transmission of Power from Internal Combustion Engines.

I, WILHELM MAYBACH, Engineer, of Cannstatt, Würtemberg, Empire of Germany, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention is for improvements in or relating to the transmission of power from internal combustion engines and has particular reference to motor vehicles, motor boats and the like.

The invention has reference to that type of apparatus in which compressed air, supplied from a suitable compressor, is employed as a power transmitting medium and the object of the invention is to provide a more complete and efficient control of the air-motor than has heretofore been obtainable.

As is usual practice in plant of this kind the internal combustion engine drives the compressor which is preferably connected to the same crank shaft and the compressed air is conveyed to the air-motors by suitable conduits. The motors may be connected either directly or indirectly to the road wheels of the vehicle and in order that the greatest possible efficiency may be obtained the air is preferably heated on its way to the motors by passing through a chamber, or conduits, heated by the exhaust from the internal combustion engine.

The difficulty encountered with apparatus of this class is that when the load is increased, as for instance when the vehicle ascends a gradient the air-motors will slow up whilst the internal combustion engine tends to continue running at its normal speed. This puts back pressure on the compressor so that overloading results and the internal combustion engine is brought to a standstill. If the surplus air is allowed to escape, the internal combustion motor can be kept running, but obviously great waste ensues with no extra power on the road wheels.

According to this invention this difficulty is overcome by simultaneously effecting a variation of the duration of opening of the compressor inlet valves and of the movement of opening of the compressor discharge valves. By this means the air motors may be controlled without waste and may run at any speed desired irrespective of that of the internal combustion engine, which preferably is maintained constant.

Any convenient mechanism may be employed for controlling the valves such mechanism forming no part of the present invention.

[*Price* 8*d.*]

Improvements in the Transmission of Power from Internal Combustion Engines.

In the accompanying drawings which illustrate one arrangement of apparatus to which this invention may be applied:—

Figure 1 is a side elevation of a vehicle with the driving mechanism attached, and

Figure 2 is a plan of the same with the body removed.

Like letters indicate like parts throughout the drawings.

The frame *a* carries at the forward end the internal combustion engine I and towards the rear two compressed air-motors II and a heating chamber III. The air compressor *b* is arranged between the two internal combustion cylinders b^1 b^2 and the piston of the compressor is operatively connected with the engine crank shaft. The air is conducted from the compressor by a pipe *d* and enters the head g^2 of the heating chamber III.

Within the chamber are a series of tubes *g* through which the air passes to the opposite head g^1 whence it is conducted to the compressed-air cylinders *c* by conduits *i*. The pipes *g* are heated by the exhaust gases conducted from the internal combustion engine by a conduit *e*. The gases pass amongst the tubes *g* and leave the chamber by an outlet *h*. The valves *t* of the compressed-air motors may be controlled by any convenient mechanism; the exhaust escapes from the outlets *l*. In the construction of apparatus shown in the drawings driving is effected from the motor shafts, which are independent of each other, by toothed wheels k^4, chains k^5 and sprockets k^6 mounted on the road wheels *n*. The wheels *n* are free on the fixed axle n^1.

It will be seen that whilst running on say level ground the air-motors *c* may be running synchronously with the internal combustion engine and consequently the air compressor *b*. The air compressor is then receiving its full charge and delivering it at normal pressure to the air-motors which immediately absorb it. If now the vehicle commences to take a gradient the additional load will slow up the motors *c* and in order that the internal combustion engine may not be overloaded the inlet valves of the compressor are adjusted by any suitable mechanism, not shown in the drawings, so that they close, say at half suction stroke, and simultaneously the discharge valves are adjusted by suitable mechanism also not shown in the drawings so that they remain closed until after the compressor plunger has passed that point of its travel at which the discharge usually takes place. The further advance of the compressor plunger raises the half charge to the normal degree of compression or even above this for the purpose of supplying the air-motors with the requisite volume of air with a pressure equal to the emergency.

The valves may be adjusted as described either by hand or by a suitable governing device.

As already stated above the air compressor is preferably operated from the crank-shaft of the internal combustion engine, the crank of the compressor and that of the internal combustion engine being set at an angle of 180° relatively to each other.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a compressor driven by an internal combustion engine, reducing the air charge drawn in by the compressor for the purpose of raising such smaller volume of air to the normal or to a higher degree of compression.

2. The complete apparatus substantially as described and illustrated in the accompanying drawings.

Dated this 8th day of November, 1905.

BOULT, WADE & KILBURN,
Agents for the Applicant.

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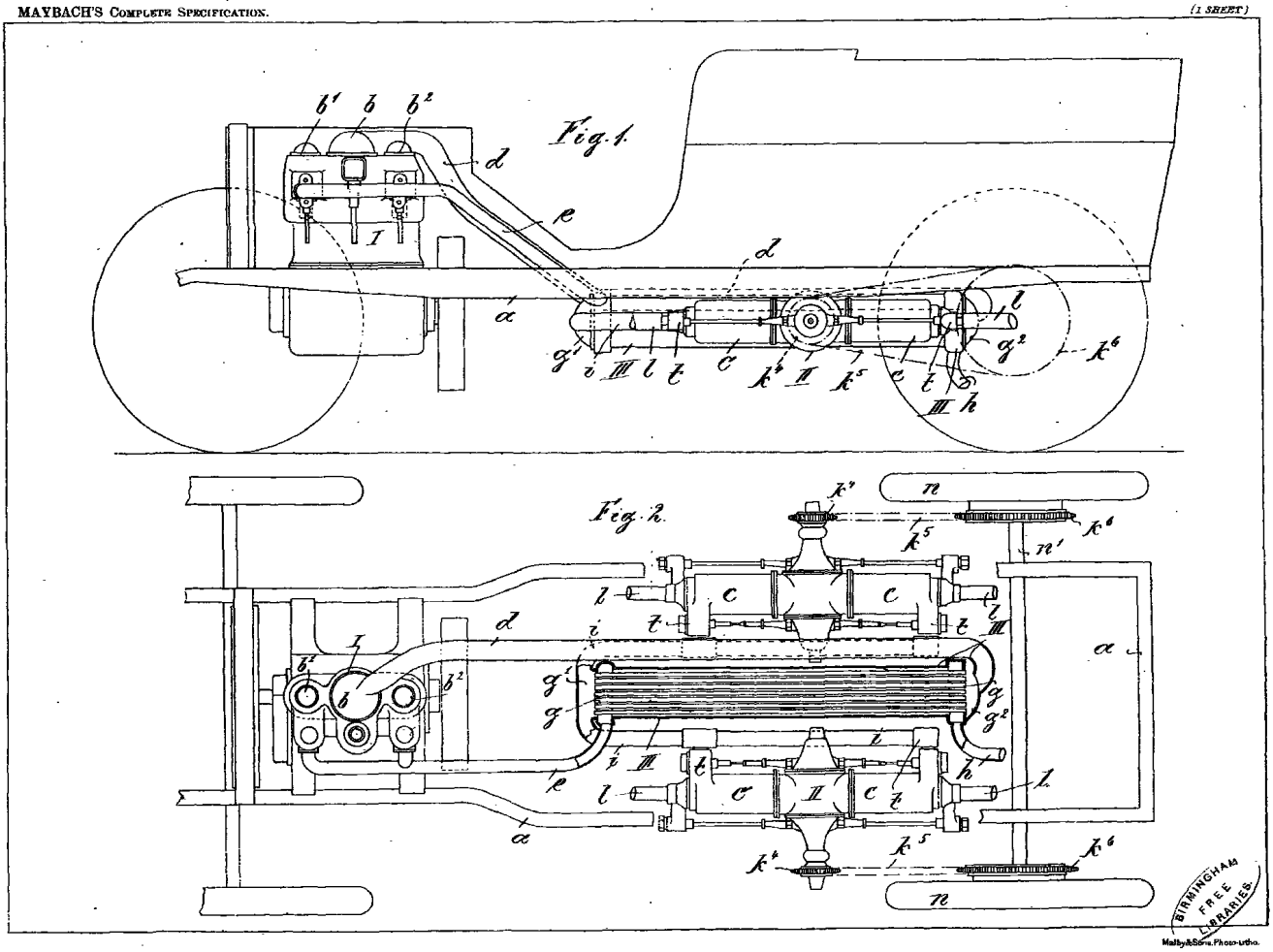
A.D. 1905. Nov. 8. N° 22,947.
MAYBACH'S Complete Specification.

(1 SHEET)

[This Drawing is a reproduction of the Original on a reduced scale.]



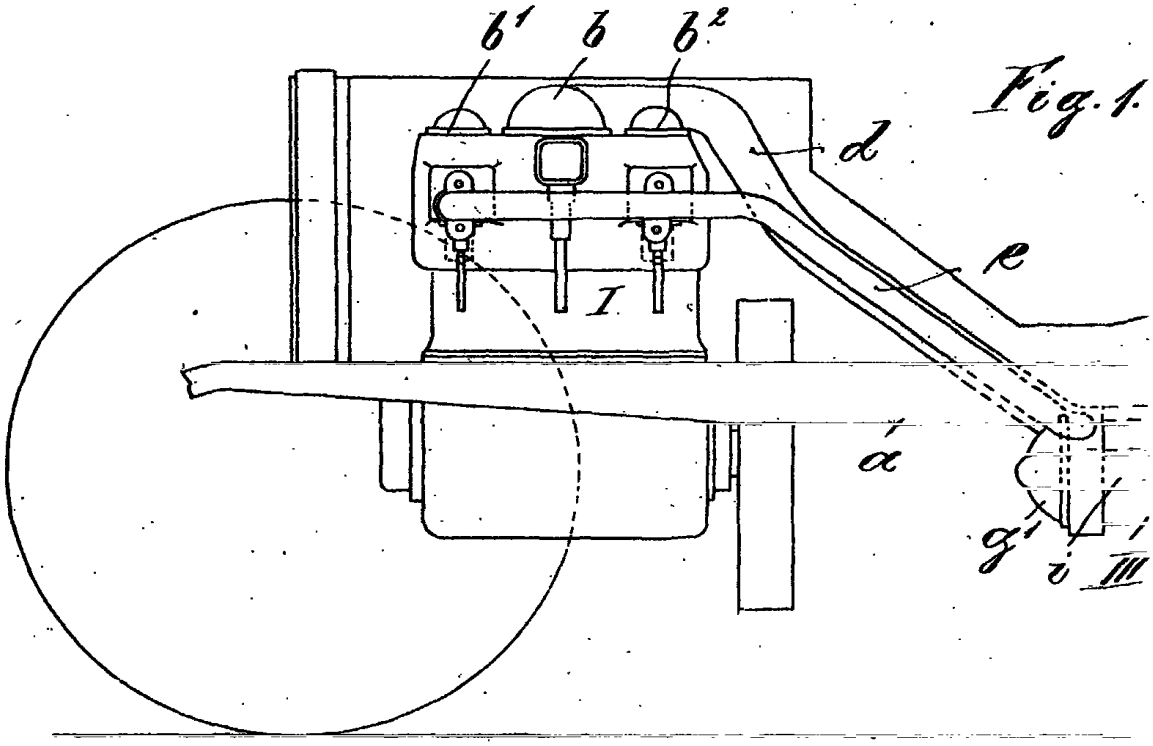
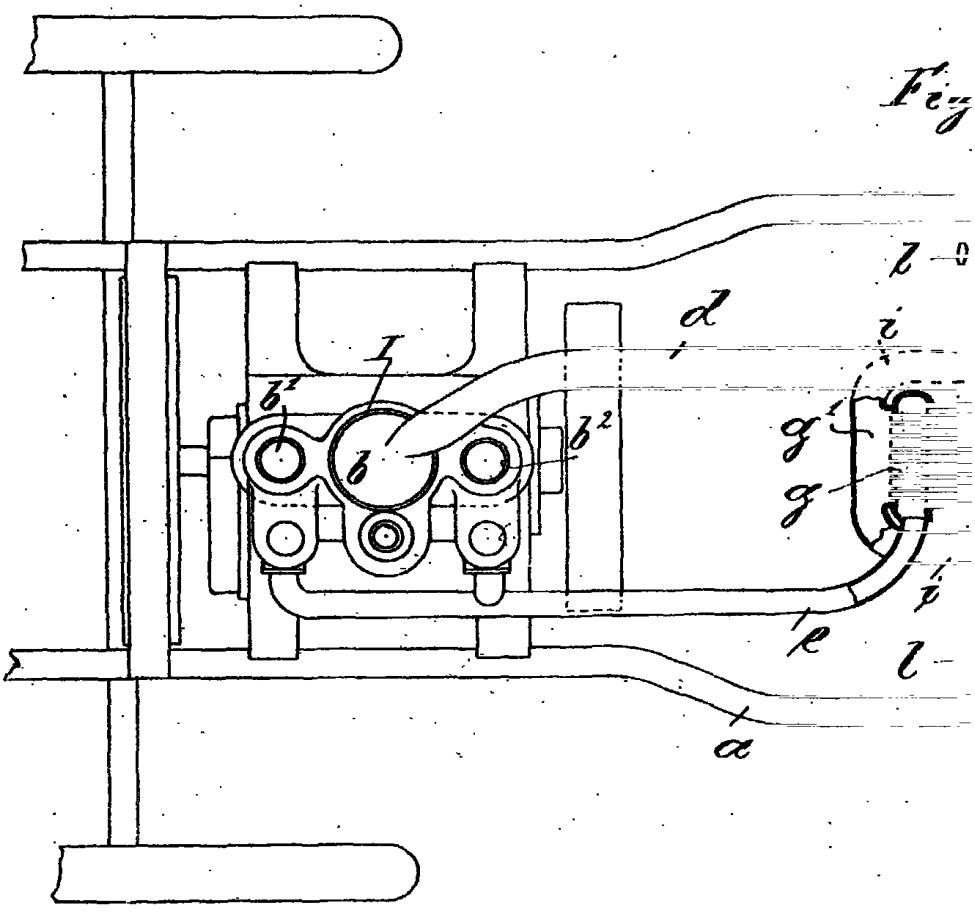


Fig. 1.



Fig

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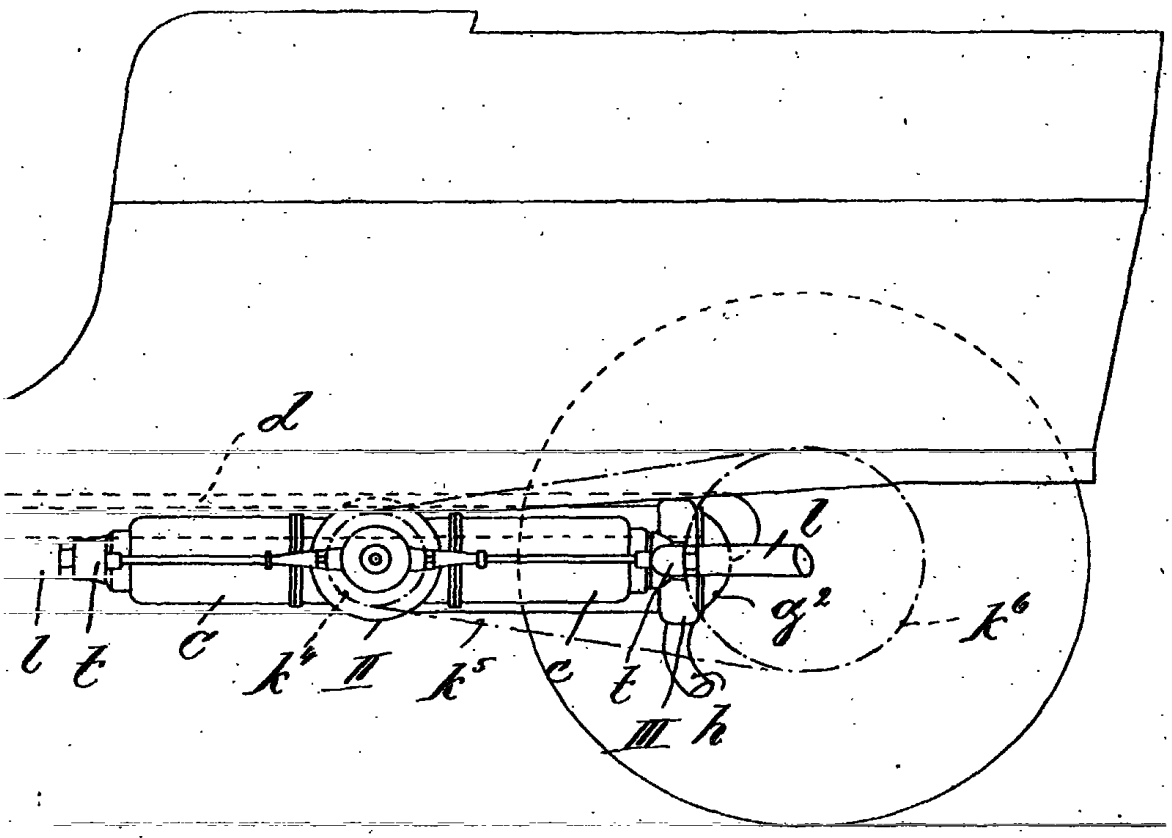

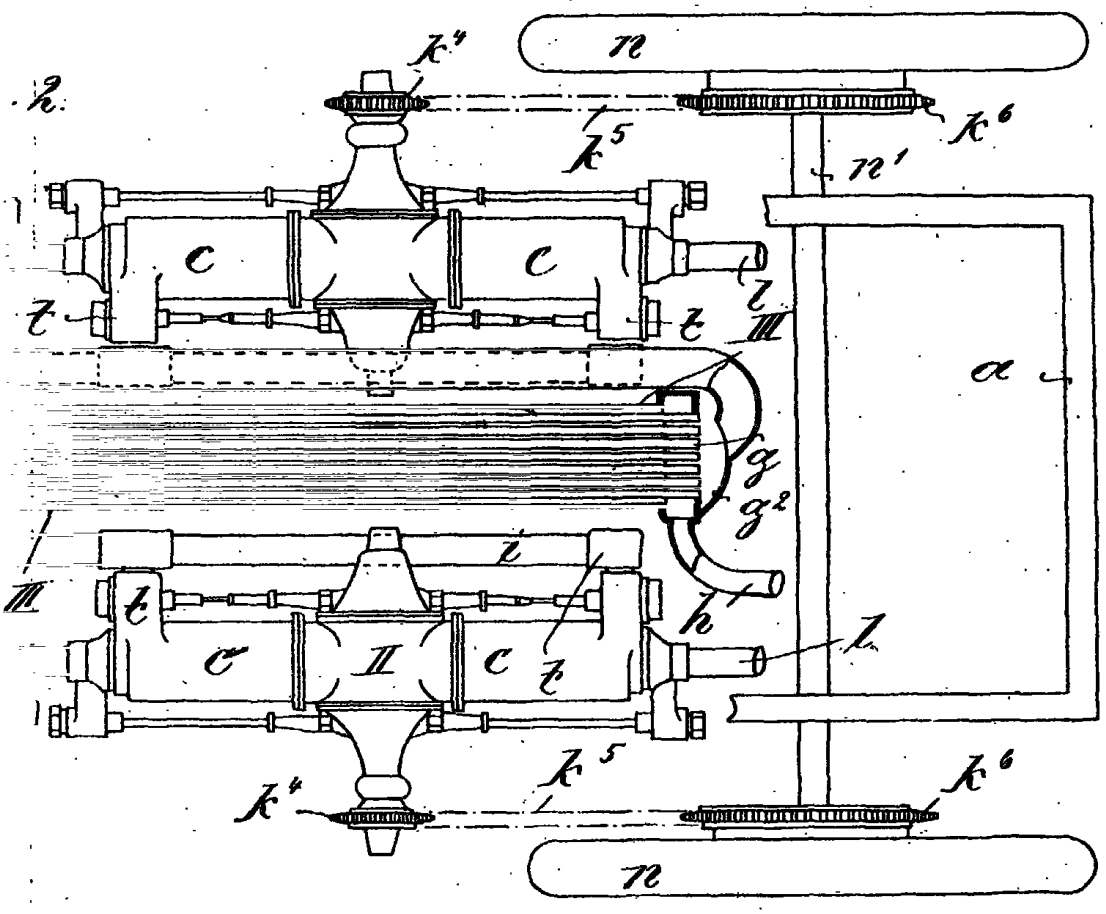

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