

(No Model.)

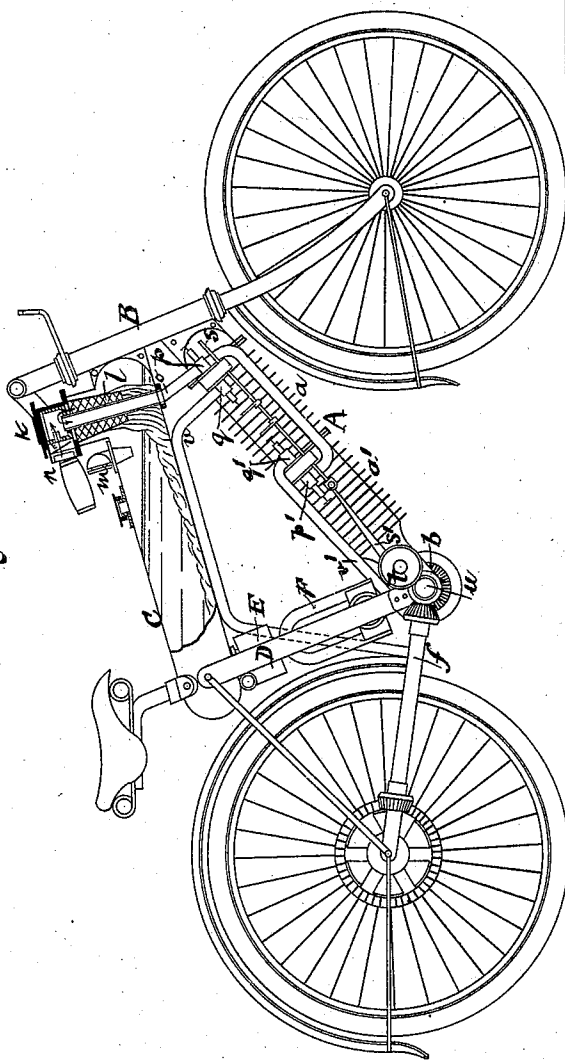
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L. RÜB.
MOTOR DRIVEN VELOCIPEDÉ.

No. 576,158.

Patented Feb. 2. 1897.

Fig. 1.



Witnesses:

Eugen Hugel
M. Hugel

Inventor:

Ludwig Rüß.

(No Model.)

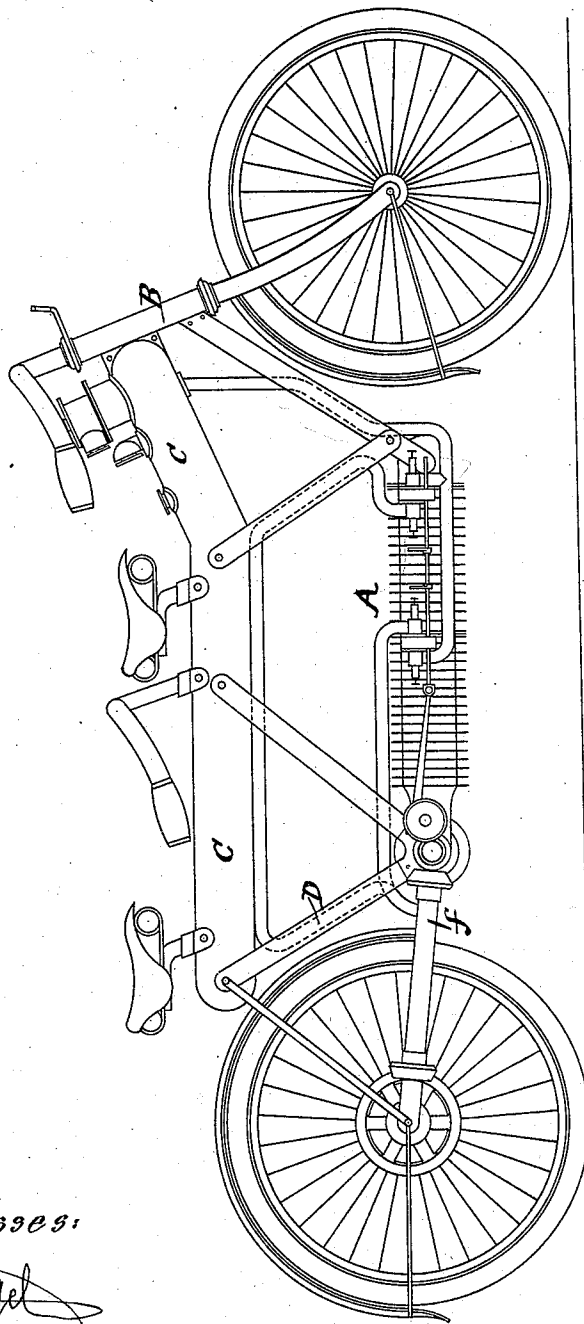
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No. 576,158.

Patented Feb. 2, 1897.

Fig. 2.



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(No Model.)

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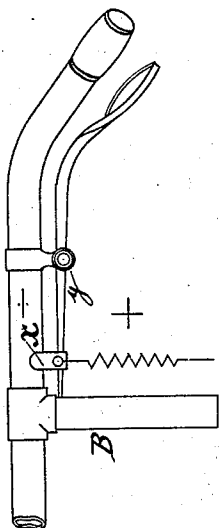
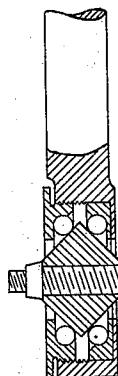
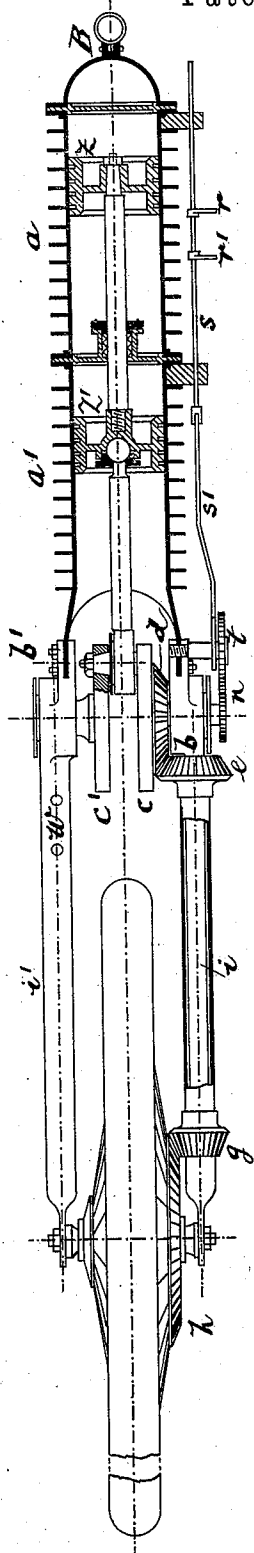
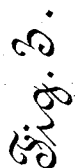


Fig. 4.



5.

Witnesses:

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M. Juge

Inventor:
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UNITED STATES PATENT OFFICE,

LUDWIG RÜB, OF AUGSBURG, GERMANY.

MOTOR-DRIVEN VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 576,158, dated February 2, 1897.

Application filed May 8, 1896. Serial No. 590,784. (No model.)

To all whom it may concern:

Be it known that I, LUDWIG RÜB, a subject of the King of Bavaria, and a resident of Augsburg, Bavaria, in the Empire of Germany, have invented certain new and useful Improvements in Motor-Driven Velocipedes, of which the following is a specification.

This invention relates to velocipedes or cycles driven by motors, and is intended to overcome the disadvantages hitherto met with in the application of motors to such vehicles, and principally to reduce the weight and render the same more easy to manage.

The improvements are broadly as follows:

First. In consequence of the peculiar construction of the whole and of the details the benzin-reservoir is made to replace the upper horizontal tube and the motor replaces the lower longitudinally-running frame-tube, as met with in a bicycle, or in a tandem bicycle. Therefore these two organs also form part of the framework of the machine, and thus avoid a complicated special framework as required in other motor-cycles for holding the benzin-reservoir, and of a motor. It is also very important that the crank-axle of the motor should be in the same place as the pedal-crank axle in the usual bicycles.

Second. In place of the tube which supports the saddle and is used in other cycles, two rails are arranged which carry the back end of the benzin-reservoir with the saddle and between which are fixed a magnetic inductor or other source of electrical force and a lubricator.

Third. The substantially horizontal position of the benzin-reservoir and its construction afford good and uniform evaporation of the benzin, while in upright receivers the benzin-surface is too small, and after a little use it is too far back from the suction-opening. In consequence benzin-gas being heavier than the air no gas, but only air is sucked in, and no explosive mixture is carried to the cylinders.

Fourth. The motor possesses two pistons, lying one behind the other. The united cylinders, lying one behind the other, are formed at their upper and lower parts so that the whole replaces the oblique lower frame-tube of the usual cycle-frame. By surrounding the whole length of the cylinders with a row of

cross-lying ribs the motor is cooled during movement by means of the air, and a special water-cooling apparatus is rendered unnecessary.

Fifth. The transmission of force from the motor to the back wheel is effected by toothed wheels in proportion about one to two, and a tube-shaft, which is put over one of two frame-tubes which unite the crank-bearings with the axle-bearing of the back wheel. The hub of the back wheel is formed of a ring of about twenty millimeters thickness to replace or act as a fly-wheel. By this arrangement no chain is necessary, giving the machine a more pleasing exterior and an easier movement. The motor can work as fly, and thus avoid the shocks which damage the pneumatic tire of the back wheel, and are very disagreeable for the rider in machines where the connecting-rod is connected in consequence of the construction and the position of the motor directly with the back wheel.

Sixth. The bearing of the connecting-rod on the crank is a double-cone ball-bearing with two rows, which supports the great load on this place and allows of renewal after long use.

Seventh. The lighting of the gas mixture in the motor is performed electrically and can only be effected in the cylinders, avoiding danger of explosion elsewhere and of fire. By this and in connection with the contacts arranged on the brake-lever and operated by means of the latter it is possible for the cyclist to ride off at once without special preparations, as are necessary in other lighting methods, and to stop also instantaneously.

In the annexed drawings the improved motor-cycle is shown in two constructions, namely, in Figure 1 for one person, and in Fig. 2 for two persons. Fig. 3 shows, on an enlarged scale, the longitudinal section through the motor and gearing; Fig. 4, the steering-rod with brake-lever and contacts, and Fig. 5 the double-cone ball-bearing.

The tandem motor A, hereinafter more particularly described, working as a four-time machine, with its cylinders *a a'* lying one behind the other and formed of a continuing tube-like piece and surrounded with cooling-ribs, is fixed at its upper part on the fork-tube B and at its lower part to the crank-

bearing bracket $b\ b'$. By the peculiar construction and arrangement of this motor the lower frame-tube of a cycle and the special frame arrangement provided for the motor in other motor-cycles are dispensed with and the crank-axle can be put exactly at the same place as the pedal-crank axle of the usual cycle. The cylinder a , Fig. 2, is closed above and below, and its piston-rod is connected with the piston of the cylinder a' . This cylinder is open on its under side and its connecting-rod is united with the motor-crank by the ball-bearings, Fig. 5. This is intended to support the great load at this place, which would not be possible for an ordinary ball-bearing. It is so constructed that after long use or in special cases it may be renewed.

One of the two fly-disks $c\ c'$ of the crank is provided with a beveled toothed wheel d , and with this gears the beveled toothed wheel e , fixed upon the tube-shaft f . This shaft carries on the other end also a beveled toothed wheel g , which gears with a beveled toothed ring h on the back-wheel hub and drives the back wheel. The tube-shaft f incloses one of the frame-tubes $i\ i'$, in which the back-wheel axle is fixed, and this frame-tube forms an axle for the tubular shaft f . The back wheel is here provided with a hub consisting of a strong metal ring h of about twenty millimeters thickness in order to operate as fly-wheel.

The benzin-reservoir C is fixed also at the front to the tube B and behind on rails D . It is formed also tube-like and replaces the upper frame-tube of the usual cycle-frame. It does not need, like other motor-cycles, a special frame construction for holding the benzin-reservoir; but it has this position (more or less horizontal) also for another reason. The level of the benzin is of larger surface and cannot sink so far below the suction-opening of the gas-mixture valve. The benzin-gas being heavier than the air, this offers a great advantage for uniform vaporization; but as the motor working as fly would suck up too quickly the benzin-gases which can be developed in the proportionally small receiver a further enlargement of the vaporizing-surface is effected by a small cylindrical basket l , of wirework, being fixed on the bottom of the mixing-chamber k , over which basket a hose-like wick is drawn, which reaches down to the back end of the receiver. The air entering through the valve m , in consequence of the suction of the motor, is forced to pass the wick and to quickly evaporate the benzin contained in it. From here the gases pass upward to the mixing-chamber k , in which the pure air entering through the valve n is mixed with the gas. From this mixing-chamber there leads through the receiver c (but separated from it) the suction-pipes o to the suction-valves $p\ p'$ of the motor, which operate automatically. The latter works in four-time. While the one piston pushes the burned gases through the escape-valve the

other one compresses the insucked gases. The escape-valves $q\ q'$, with springs, are operated alternately by the fingers $r\ r'$ upon the rod s . The movement of the rod s is effected by the connecting-rod s' , lying in an eccentric groove in the toothed wheel t , by the gearing of the toothed wheel u , fixed upon the motor-axle, with the wheel t revolving around a pin. From the escape-valves $q\ q'$ lead the exhaust-tubes $v\ v'$, which enter at w into the frame-tube i' . The latter is perforated sieve-like on its under side in order to weaken the noise of the exhaust-gases. The exhaust-tubes may be conducted directly to the frame-tube, or, as shown, one of them, v , makes a detour under the benzin-reservoir in order to serve for warming it.

Between the two rails D , which carry the back of the benzin-reservoir and replace the saddle-tube, is a lubricator E and a source of electrical force, here a magnetic inductor F . The first provides the two cylinders, by suitable conducts, (not shown on the drawings,) automatically with oil. It is influenced from the motor-axle.

The magnetic inductor F effects the lighting of the gas mixture in the cylinders, to which the electrical current passes on one side through the metal parts of the machine and on the other side through an insulated covered conducting-wire. In the circuit is a contact device, so that it may be closed or interrupted at the most suitable place by a pressure. This is effected by arranging a contact-clamp x on the brake-lever y , in order that by a slight pull the current can be interrupted at once and the lighting will cease immediately.

After having filled the benzin-receiver and the lubricator, which hold sufficient for about twelve to fifteen hours' run, the machine, of which the more delicate parts are protected against dust and weather, is ready. To set it in action, it is wheeled forward two to three steps and the motor is in operation. By pushing the cycle along the motor-crank is moved by the gear from the back wheel and the connecting-rod is operated to bring the pistons $z\ z'$ from the back dead-point to the front dead-point. Behind the piston z gas is thus sucked in, and by the then following return of the pistons it is compressed and lighted at the back dead-point by means of an electric spark, caused to form at this moment by means of any suitable lever-gear. The then following explosion moves the piston forward, and the piston z' then sucks in gas mixture in order to compress it when returning, while the piston z drives out the exhaust-gases through the escape-valve. The exhaust is effected from the crank-axle, which operates alternately the escape-valves $q\ q'$, while the two suction-valves $p\ p'$ act automatically.

The speed of the machine can be regulated in any manner by the brake-lever, and also the motion can be stopped quickly. In the latter case the stopping of the lighting, the air compression taking place in the motor,

and the usual effect of the wheel-brake operate together in order to stop the machine at once.

I claim as my invention—

5 1. In a motor-driven cycle, a frame having its upper member formed of a benzin-reservoir C and having its lower front member composed of a tandem motor A, said reservoir and tandem motor being connected at
10 their front ends to the steering-post and at their rear ends respectively to the saddle-pillar bracket and to the pedal-crank-shaft bracket of said frame.

2. In a motor-cycle the combination of a
15 longitudinally-placed benzin-reservoir C, a mixing-chamber thereon, a wire-sieve basket l provided with a long wick before the entrance to the mixing-chamber and an exhaust-tube v under the reservoir in order to obtain
20 a larger surface for the level of the benzin to diminish the sinking of the level and to warm the benzin in order to obtain a good and uniform evaporation.

3. In a motor-cycle, the combination of a

longitudinally-placed motor with a connecting-rod and fly-disks c c' on the motor-axle, and a double-cone ball-bearing in two rows for connecting said connecting-rod and fly-disks. 25

4. In a motor-cycle the combination of a frame, a motor comprising part of said frame, 30 a back wheel provided with a heavy hub replacing a fly-wheel, the tooth-gearing d e g h connecting said motor and back wheel and the tube-shaft f supported by the frame-tube.

5. In a motor-cycle an explosive motor, an
35 electrical lighting-device and a brake-lever y in combination with a movable electrical contact x for the purpose of closing or interrupting the current of the electrical force used for the lighting device by operation of the brake-
40 lever.

In witness whereof I have signed this specification in presence of two witnesses.

LUDWIG RÜB.

Witnesses:

EUGEN GUGEL,
M. GUGEL.