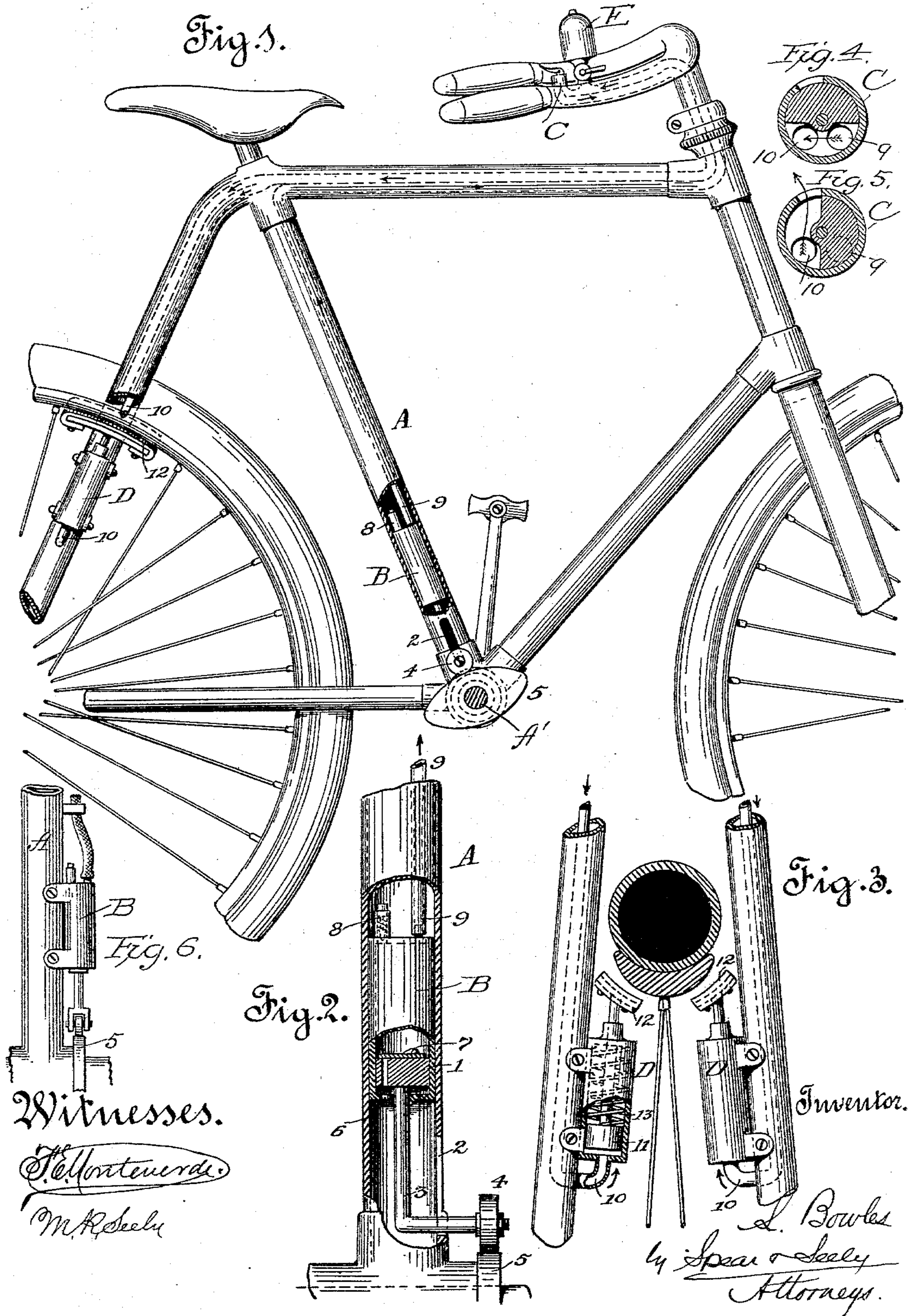


(No Model.)

L. BOWLES.
PNEUMATIC BICYCLE BRAKE.

No. 597,456.

Patented Jan. 18, 1898.



Witnesses.

J. L. Monteverde

M. R. Seely

Fig. 3.

Inventor.

L. Bowles
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UNITED STATES PATENT OFFICE.

LEWIS BOWLES, OF SAN FRANCISCO, CALIFORNIA.

PNEUMATIC BICYCLE-BRAKE.

SPECIFICATION forming part of Letters Patent No. 597,456, dated January 18, 1898.

Application filed April 9, 1896. Serial No. 586,837. (No model.)

To all whom it may concern:

Be it known that I, LEWIS BOWLES, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Pneumatic Brakes for Bicycles and other Vehicles; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to pneumatic brakes for bicycles; and it consists in certain special features of construction and arrangement fully hereinafter described, and shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a bicycle with my pneumatic brake attached. Fig. 2 is a vertical section of one of the tubes of the frame, showing the air-pump and means for operating it. Fig. 3 is a cross-section through the rim and tire of the bicycle-wheel, showing the brakes in rear elevation. Figs. 4 and 5 are detail sections of the controlling-valve. Fig. 6 shows a modification in the position of the air-pump and air-pipe.

Attached to one of the tubes A of the bicycle is an air-pump B, the piston 1 of which derives a reciprocating motion from the motive power of the machine. This air-pump may be attached to a suitable bracket on the outside of the tube, but I prefer to place it, as shown, within the tube and just above the intersection through which the crank-shaft A' passes. When placed in this way, the tube is slotted at 2 to allow the operating connection to work and also to admit air to the pump. The piston 1 has a connecting-rod 3, which extends through the slot and has a roller 4, which I prefer to drive by a double cam 5 on the crank-shaft A', just inside of the sprocket, or which might be attached to or form part of the sprocket. A vent 6 admits air to the cylinder of the pump, and this air at the downward stroke of the piston 1 passes through a flap-valve 7, which closes on the upstroke. An automatic safety-valve 8 is attached to the pump-cylinder, having a spring to render it self-seating, through which the air can blow off when in excess of any properly-estimated pressure in the cylinder. A pipe or tube 9 carries the air, under pressure, from the air-pump to the controlling valve or

cock C, which is located within easy reach of the rider. When the air-pump is outside the frame, this tube will be carried outside also; but when the pump is located within the tube A, I prefer to utilize the hollow frame of the bicycle, as far as possible, to contain my air-pipes. I have shown in the drawings all the air-pipes carried within and concealed in this way, which gives a better appearance to the machine and is probably the construction to be preferred. I do not, however, limit myself to it, as it is perfectly-feasible to carry the air-pipes outside the bicycle-frame. The air-pipes may be either rigid or flexible. The tube 9 passes up through the upper tube of the diamond frame, through the steering-head and hollow handle, and is connected to the cock C at a convenient place on the handle.

The cock C, as shown in Figs. 4 and 5, is a simple three-way valve by which air can be admitted from tube 9 into tube 10 or from tube 10 into the atmosphere, the former to set and the latter to release the brake. When the brake is not in use, the air will be compressed in this pipe as in a reservoir, all danger of bursting being obviated by the safety-valve before mentioned.

To the shell of the cock C is connected an air-tube 10, which returns upon the tube 9, as shown, and follows the framing to the rear forks, where it divides, and each part enters a separate brake-cylinder D, secured on the inner faces of said forks. Each cylinder D contains a single-acting piston 11, having a stem connected to a brake-shoe 12. These brakes are normally in proximity to the rim of the driving-wheel, and when the cock C is opened are forced simultaneously and with equal pressure against the opposite sides of the rim, together giving a large amount of braking-surface and a sufficient braking pressure, the latter being divided and equalized on both sides, so that no undue strain is brought upon the rim, spokes, or bearings. The brakes are automatically released by springs 13, held between the brake-pistons and the ends of the brake-cylinders, such springs acting, as soon as the cock has been turned, to permit the air to escape through such cock. The brake can be applied suddenly or gradually, since the cock C is a regu-

lating controller of the amount of compressed air allowed to pass from the air-supply pipe 9 to the pipe 10 and brake-cylinders.

I have found in practice that the resistance 5 of the air-pump when the wheel is running is inappreciable and may be neglected. A few revolutions compress air to the capacity of the pipe 9, after which the air blows off through the safety-valve. When the brake 10 is being applied, of course the air-compression is throughout the tubes 9 and 10, giving a continuous supply of air and holding the brakes in constant contact until the cock C is shut off.

15 I may provide a whistle E at a convenient point, as shown in Fig. 1, and by connecting it to the pipe 9 and giving it an independent valve I may draw upon my reservoir of compressed air for alarm or signaling purposes.

20 What I claim is—

1. In combination with a bicycle, an air-pump, means operated by the crank-shaft for driving said pump, an air-pipe leading from said pump, a valve placed within reach of the

rider, a continuation of said pipe leading from 25 said valve, the valve being adapted to direct air into such continuation, or to discharge air therefrom, branches of said continuation, and air-brakes secured to the rear forks and connected to said branches, substantially as de- 30 scribed.

2. In combination with a bicycle, having a hollow frame, an air-pump, secured within one of the tubes of the frame, a piston therefor, 35 having a rod projecting through said tube and driven by a rotary part of the bicycle, an air-pipe leading from the pump to an air-brake, and carried within the tubes of the frame, and a controlling-valve in said pipe, substantially 40 as described.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 31st day of March, 1896.

LEWIS BOWLES.

Witnesses:

L. W. SEELY,

JOHN W. HALL.