

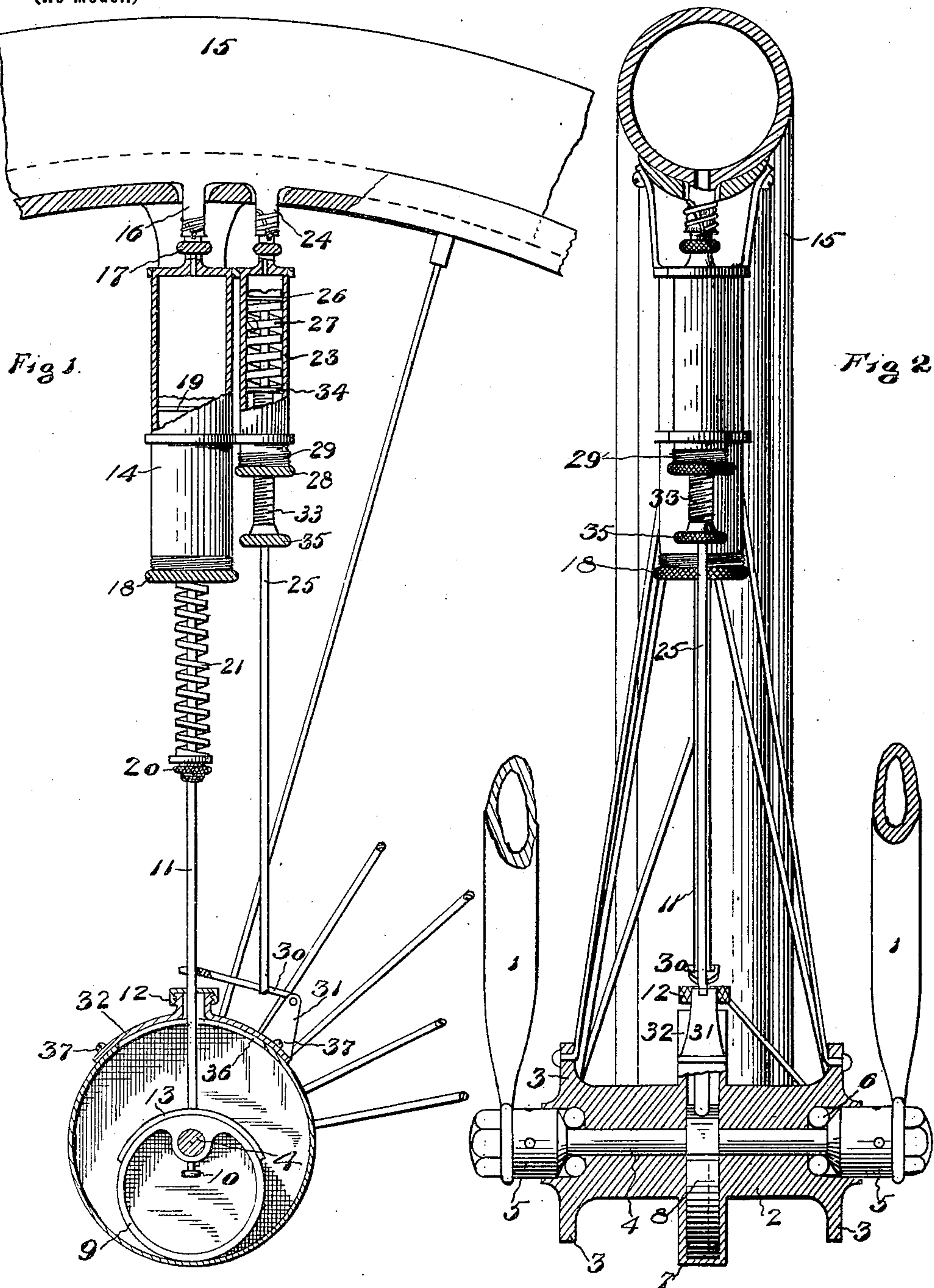
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C. J. DOWLING.
AUTOMATIC PUMP FOR BICYCLES.

(Application filed June 19, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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AUTOMATIC PUMP FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 659,653, dated October 16, 1900.

Application filed June 19, 1900. Serial No. 20,841. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. DOWLING, a citizen of the United States, residing at Chapman, in the county of Dickinson and State of Kansas, have invented certain new and useful Improvements in Automatic Pumps for Bicycles; 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.

My invention relates to bicycles, and more particularly to a pumping apparatus designed to keep the tires with which it is placed in coöperation properly inflated.

One object of my invention therefore is to provide an automatic air-pump for each wheel of a bicycle whereby any desired degree of pressure may be maintained within the tire.

A further object is to so construct and arrange the parts of my invention that when the tire has become filled to the desired degree the pump will automatically discontinue to act and will be again automatically started in the performance of its work when the air in the tire shall have escaped therefrom sufficiently to reduce the pressure within the tire below the point deemed desirable.

Other advantages and objects will be made fully apparent from the following specification considered in connection with the accompanying drawings, in which—

Figure 1 is a vertical section of my improved pumping apparatus complete, showing such portion of the wheel as is considered necessary to illustrate the relative arrangement of the several parts. Fig. 2 is a central section of Fig. 1, taken on a line at right angles thereto and on a line central to the axle of the wheel to which my invention is applied.

In order to conveniently refer to the several parts of my invention and the elements deemed necessary to illustrate the same, 1 indicates the lower ends of the fork of a bicycle of the usual or any preferred construction, while 2 indicates the hub of the wheel, provided at each end with the spoke-engaging flange 3 and with a central bore adapted to receive the clamping-bolt 4. Suitable recesses are provided in each end of the axle,

designed to receive the inner ends of the cones 5, it being understood that a series of balls 6 are to be interposed between the inner ends of said cones and the bottom of said end recesses, whereby ball-bearings will be provided for said hub, it being further understood that the bore designed to receive the bolt 4 shall be of sufficient size to loosely receive the same, and thus disposing the entire frictional contact upon said balls. The central part of the hub 2 is provided with the casing 7, which provides the chamber 8, within which I dispose the pump-actuating cam disk or casing 9, properly secured to the axle in any preferred way, as by the set-screw 10. (Clearly shown in Fig. 1.)

It will be understood that the axle with its accompanying casing 7 may be made in any preferred way, preferably in section, whereby the cam 9 may be readily introduced and secured in its operative position. The cam-controller 9 is designed to actuate the pump or piston rod 11, which extends downward through the suitable stuffing-box 12, provided in the peripheral face of the casing 7, as indicated in Fig. 2.

The lower end of the piston-rod 11 is provided with the shoe 13, which is properly shaped to fit the peripheral face of the edge of the cam-controller 9. The piston-rod 11 extends upward into coöperation with the pumping-cylinder 14, which may be in any preferred way and properly placed in connection with the tire-tube 15, as by the integral nozzle or extension 16, it being understood that any preferred valve, as indicated by the numeral 17, may be located in the outer end of the cylinder, whereby the air will be retained in the tire-tube, as is usual.

The piston-rod 11 extends through a suitable aperture provided in the cylinder-head 18 and is provided with a suitable form of piston 19, it being understood that a proper form of inlet-valve shall also be provided to coöperate with the cylinder 14, whereby the air will be freely admitted therein and from thence driven by the piston 19 through the valve 17 into the tire 15. In order to hold the piston-rod normally inward, I secure to said rod a short distance from the head 18 a disk 20, and between said disk and head I dispose the compression-spring 21. If deemed

desirable, a proper form of union, as indicated by the numeral 22, may be provided upon the piston-rod, preferably at a point near the spring anchoring-disk 20, in order that the several parts of my pump may be readily separated from each other and removed or to enable any one of said parts to be replaced or repaired. If deemed desirable, the piston-rod and the shoe 13 may also be connected together by a threaded socket provided in said shoe.

Designed to cooperate with the cylinder 14 is the auxiliary cylinder 23, which is connected to the tire-tube 15 by a suitable tubular extension 24. Designed to cooperate with the cylinder 23 is the plunger 25, provided at its outer end with a piston 26, fitting the cylinder 23, the said piston being normally held in the outer end of the cylinder 23 by the compression-spring 27, disposed within said cylinder around the plunger 25. The lower end 28 of the cylinder 23 may be readily removed, inasmuch as it is secured in place by the threaded flange 29, entering the end of said cylinder. The plunger 25 extends downward and is pivoted to the arm 30, one end of which is pivotally attached to the ear 31 or between a pair of said ears properly secured to the anchoring-plate 32, as clearly shown in Fig. 1. The free end of the arm 30 is designed to bear against the piston-rod 11, and said free end may be, if preferred, bifurcated or provided with a yoke designed to straddle said piston-rod, whereby the said free end will not become casually displaced from its operative position.

The plunger-rod 25 is normally held upward by the spring 27, and in order to impart any desired degree of tension to said spring I provide in the cap 28 the exteriorly-threaded tubular regulator 33, which is provided at its upper end with the disk 34, designed to engage the inner end of the spring 27, and it is obvious that since the plunger 25 plays freely within the tubular regulator 33 any desired degree of tension may be secured by adjusting the regulator 33 by means of the milled head 35. It will be understood that the piston 26 shall fit its cylinder so that it will be air-tight, and thus prevent the escape of the air from the tube downward through the cylinder 23, since there is no valve connection between the cylinder and the tire-tube.

In order to render the controller 9 and the shoe 13 accessible, an opening 36 may be provided in the casing 7, which may be covered by the plate 32, properly secured in place by the screws 37, said plate being provided with a suitable cap or stuffing-box 12, through which the piston-rod is adapted to freely play, it being understood that the only purpose subserved by a stuffing-box at this point would be to contain a light packing which would prevent grit or the like entering the casing 7.

Having thus fully described the construction of my improved automatic pumping ap-

paratus, the operation thereof may be stated to be as follows: Inasmuch as the bolt or axle proper, 4, remains stationary the hub 2 will play around said bolt and will carry with it the casing 7, and since the cam-controller 9, secured to the bolt 4, remains stationary with the bolt 4 it follows that the piston-rod 11 will be actuated by means of the cam-controller 9 contacting with the shoe 13. The piston-rod 11 will therefore be reciprocated within the cylinder 14 and the pumping process inaugurated and the air forced from the cylinder 14 into the tire-tube 15, the recession of the air being prevented by the valve 17. There being no valve between the cylinder 23 and the tire-tube, it is obvious that when the pressure within the tire-tube is sufficient to overcome the tension of the spring 27, the piston 26 will be forced downward, thereby compressing said spring and forcing the plunger downward upon the arm 30, the free end of which will be brought to bear against the piston-rod 11, and thus hold said rod outwardly extended or prevent it from acting in response to its spring 21, the result being that the piston-rod will be held outward by the arm 30 and the shoe 13, carried by said rod, will be left out of contact with the cam-controller 9 and the pumping process stopped. When the air in the tire-tube 15 shall have become sufficiently exhausted to again permit the spring 27 to assert itself, said spring will so act upon the plunger 25 that it will be drawn outward, thereby elevating the free end of the arm 30 out of contact with the piston-rod 11, the result being that the piston-rod when thus released from contact with said arm will be forced inward by the spring 21, and thus dispose the shoe 13 again in contact with the controller 9.

It will thus be seen that my improved bicycle-pump is entirely automatic in its operation, and since the regulator 33 may be easily adjusted any desired pressure may be secured for the tire-tube 15.

It is obvious that my automatic pumping apparatus may be located upon both wheels of the bicycle or all the wheels of any vehicle employing pneumatic tires, only simple changes being necessary to render my pump available for all of the purposes for which such an appliance will be found desirable.

Having thus fully described the construction and operation of my improved automatic pumping apparatus, further description is deemed unnecessary.

What I claim as new, and desire to secure by Letters Patent, is—

1. The herein-described pump for bicycles or the like comprising a pumping-cylinder having a valve connection with the tire-tube; a piston-rod cooperating with said cylinder; means to hold the rod normally inwardly extended; an eccentric carried by the axle adapted to actuate said rod, in combination with an auxiliary cylinder directly connected with the tire-tube; a plunger cooperating

with said auxiliary cylinder; a piston for said
plunger and a pivoted arm connected to the
lower end of said plunger and adapted by
its free end to bear against said piston-rod
5 whereby when the overflow of pressure from
the tire-tube shall cause the inward move-
ment of the piston upon said plunger, the
latter will bear upon said arm and cause the
same to engage the piston-rod and hold it
10 out of engagement with the actuating means
carried by the axle, substantially as specified
and for the purpose set forth.

2. In automatic pumps for bicycles or the
like, a suitable pumping-cylinder having valve
15 connection with the tire; an eccentric carried
by the hub and operatively connected with the
piston; suitable valve connection between
the said cylinder and tire, in combination

with an auxiliary cylinder having direct con-
nection with the tire; a plunger having a piston 20
fitting said auxiliary cylinder; a compression-
spring located in said cylinder and means to
regulate said spring and an arm pivoted to
the lower end of the plunger and to a contig-
uous portion of the hub, said arm being 25
adapted to engage the piston-rod of the pump-
ing-cylinder and hold it in a quiescent state
when the pressure in the tire-tube shall have
exceeded the desired point, all substantially
as specified and for the purpose set forth. 30

In testimony whereof I affix my signature
in presence of two witnesses.

CHARLES J. DOWLING.

Witnesses:

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