

(No Model.)

R. MAINARDI.

AUTOMATIC PUMP FOR INFLATING PNEUMATIC TIRES.

No. 573,826.

Patented Dec. 22, 1896.

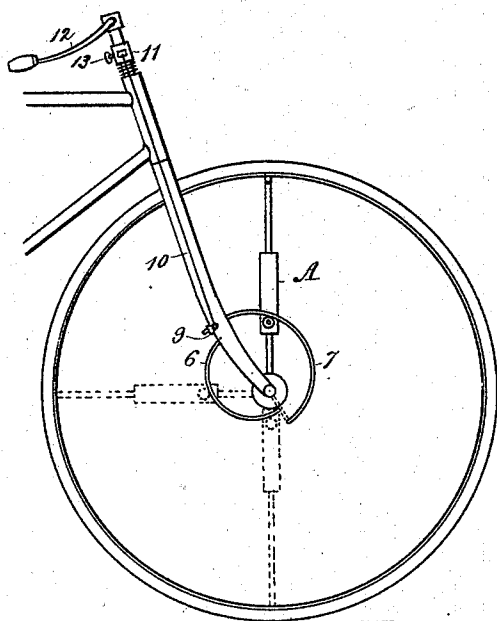


Fig. I.

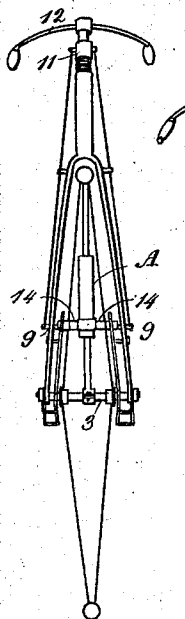


Fig. II.

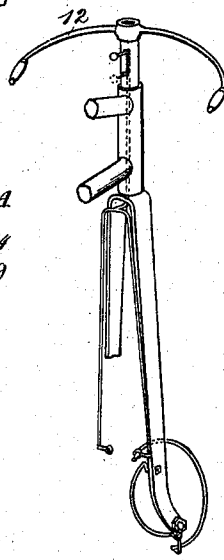


Fig. V.

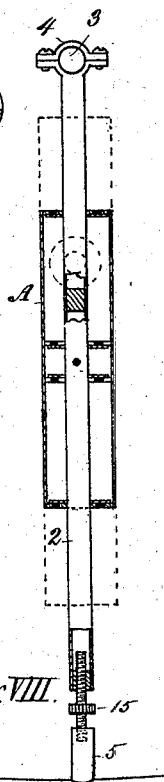


Fig. VIII.

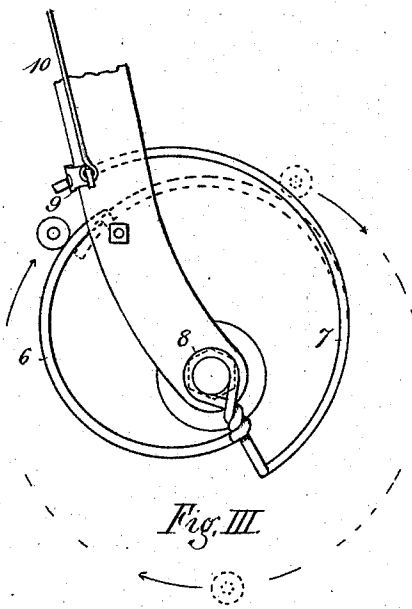


Fig. III.

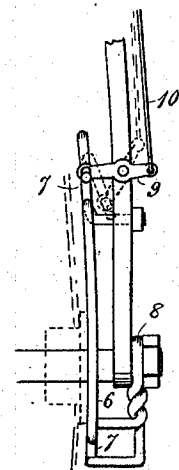
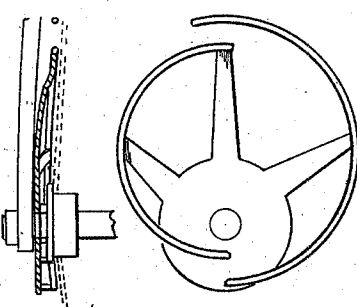


Fig. IV.

Fig. VII.

Fig. VI.



Witnesses
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UNITED STATES PATENT OFFICE.

ROMOLO MAINARDI, OF CINCINNATI, OHIO.

AUTOMATIC PUMP FOR INFLATING PNEUMATIC TIRES.

SPECIFICATION forming part of Letters Patent No. 573,826, dated December 22, 1896.

Application filed April 27, 1896. Serial No. 589,206. (No model.)

To all whom it may concern:

Be it known that I, ROMOLO MAINARDI, a subject of the King of Italy, residing at Cincinnati, in the county of Hamilton and State

of Ohio, have invented a new and useful Improvement in Automatic Pumps for Inflating Pneumatic Tires, which improvement is fully set forth in the following specification and accompanying drawings, in which—
Figure 1 is a side elevation of a bicycle-wheel, illustrating the application of my improved automatic air-pump; Fig. 2, a front elevation; Fig. 3, an enlarged detail of the segments with a portion of the shifting mechanism; Fig. 4, a rear edge view of the same; Fig. 5, a perspective detail of a modified form of shifting mechanism; Fig. 6, a modified form of mounting the segments; Fig. 7, an edge view of the same, and Fig. 8 a sectional view of the pump and piston-rod with their connections.

My invention relates to improvements in air-pumps for automatically inflating pneumatic tires; and it consists in certain peculiarities in the construction, operation, and novel arrangements of the several parts thereof, as will be hereinafter more fully set forth and specifically claimed.

The objects of my invention are, first, to provide means whereby pneumatic tires may be automatically inflated without interrupting the progress of the vehicle; second, to avoid the trouble of stopping and dismounting from the vehicle, attaching the ordinary pump, and the labor and delay of operating and detaching the pump; third, to provide means for constantly and automatically refilling tires from which the air may have escaped in consequence of puncture or other accident, and, fourth, to have at immediate disposal a pump which may be brought into action or rendered inoperative whenever desired.

In order to enable others skilled in the art to which my invention pertains to make and use the same, I will now proceed to describe it by referring to the accompanying drawings, in which—

A represents the pump-cylinder, which will be hereinafter specifically described; 2, the hollow rectangular piston-rod, the inner end

of which is secured to the axis 3 of the wheel by a clip 4 or other suitable means, the outer end being secured to the mouth of the feeding-tube 5.

6 and 7 respectively indicate segments which lie in a plane parallel with the spokes of the wheel and are preferably made of bent wire. They may consist of a single section of wire bent to form an eye 8, then twisted and bent laterally and inwardly at suitable intervals, thence assuming the required coincident curvature, as indicated, or they may be formed of a disk of suitable metal, as shown in Fig. 6, with branches which rigidly hold the wires passing into their recesses, the said branches being bent inwardly, so that these segments shall be in a plane with the spokes of the wheel. The lateral terminal of the smaller segment 6 is secured to the fork-limb by a bolt or equivalent means. The free terminal of the larger segment passes through a lever 9, pivoted to the fork-limb, the outer projection of the lever being connected by a rod 10, extending vertically and attached to an adjustable collar 11 on the stem beneath the handle-bar 12, said collar being kept in the desired position by a screw 13; or, if preferred, the said rod may pass upwardly within the stem, as shown in Fig. 5, and have its upper extremity bent laterally and projecting through a Z-shaped slot beneath the handle-bar and terminating in a knob by which the rod may be easily raised or lowered in order to open or close the larger segment, and thus bring the pump into operation, or stop it when desired.

It will be understood that the cam-sections, the lever, and connections may be duplicated on the opposite side of the wheel and that every wheel will require the same apparatus.

The pump-cylinder is provided with lateral trunnions 14, which carry antifriction-rollers, said trunnions engaging upon or within the segments as the pump is carried around by the wheel. When the free end of the larger segment is open, as shown, it is evident that the trunnion-roller will pass within and be carried by the cam toward the axis, thereby effecting a full stroke of the pump in one direction.

When the roller emerges from the lower space and engages the exterior of the smaller

cam 6, it rides on a contrary inclination and moves the pump-cylinder in the opposite direction, thereby completing its reciprocal stroke. Should it be desired to suspend the action of the pump, it is only necessary to depress the end of the larger segment by means of the lever-shifting mechanism, as clearly indicated in Figs. 3 and 4, so that the free end is depressed within the arc of the smaller segment, causing the trunnion-roller to ride over the junction and be carried around in an orbit concentric to the wheel-axis, the pump being thus deprived of any impelling agency.

Referring to Fig. 8, it will be observed that my pump differs from others by having an angular or preferably a square piston-rod, so that the trunnions being fastened to the cylinder shall be made secure in a position parallel with the axis of the wheel and reciprocate freely between the spokes of the same. Otherwise they would be distorted and rendered useless.

The end caps of the pump-cylinder are provided with air-inlet apertures and suitable adjacent valves. Intermediately in the stroke range of the pump are two piston-head disks, separated by a short interval and having their adjacent inner faces likewise provided with valves, the disks being perforated. The square piston is also perforated between the said valves in order to admit air. When the cylinder moves in either direction, the air is compressed in the end approaching the adjacent fixed piston-head, the valve of the latter opening and the next adjacent valve seating, causing the air to pass into the piston and thence through the feeding-tube into the tire, the opposite end of the cylinder meanwhile taking in an air-supply for the alternate movement of the cylinder.

It will be understood that in view of the square form of the piston-rod it cannot be rotated while being connected with the neck of the feeding-tube. I therefore provide a tubular screw which is threaded into a plug or nut in the outer extremity of the piston-rod. This being adjusted to allow its projecting end to enter the threaded bushing of the neck of the feeding-tube is then turned to the desired position by means of the milled flange or collar 15. It will also be observed that the end of the hollow piston-rod which connects with the wheel is hermetically sealed or otherwise securely closed below the valve-

disk, so that the air will be always forced out through the tubular screw.

It is evident that changes in the form, construction, combination, and arrangement of the several parts of my invention may be made without departing from the spirit of my invention, and that I may apply the same to any form of vehicle having pneumatic tires.

What I claim as new is—

1. In a pump for automatically inflating pneumatic tires of vehicles, an angular tubular piston-rod having at one end a clip or other suitable fastening device, the opposite end containing a tightly-fitting threaded nut or plug, a threaded tubular screw adapted to engage the said nut and having a collar whereby it may be turned into or out of the nut, the outer extremity of the said tubular screw being adapted to engage the neck of the feeding-tube of the tire; a pump-cylinder having suitable valves and adapted to move reciprocally on the said hollow piston-rod and provided at suitable points on its surface with trunnions carrying antifriction-rollers to engage within or without the cam-segments 6 and 7, all constructed, arranged and operating substantially as shown and described.

2. In a pump for automatically inflating pneumatic tires, the herein-described angular tubular piston-rod provided near its longitudinal center with perforated piston-head disks and valves between said disks, perforations for the admission of air into the upper end of said piston-rod, the lower end being hermetically closed; a pump-cylinder having suitable valves and adapted to move reciprocally on the said piston-rod and having lateral trunnions bearing antifriction-rollers adapted to engage within and without the cam-segments secured in eccentric relation to the wheel-axis, one of said segments having a free terminal connected to a shifting lever actuated as described and adapted to disengage the antifriction-rollers from the segment and render the pump inoperative substantially as and for the purpose herein specified.

In testimony that I claim the foregoing I have hereunto set my hand, this 9th day of April, 1896, in the presence of witnesses.

ROMOLO MAINARDI.

Witnesses:

ANGELO TORIEL,
R. S. MILLAR.