

(No Model.)

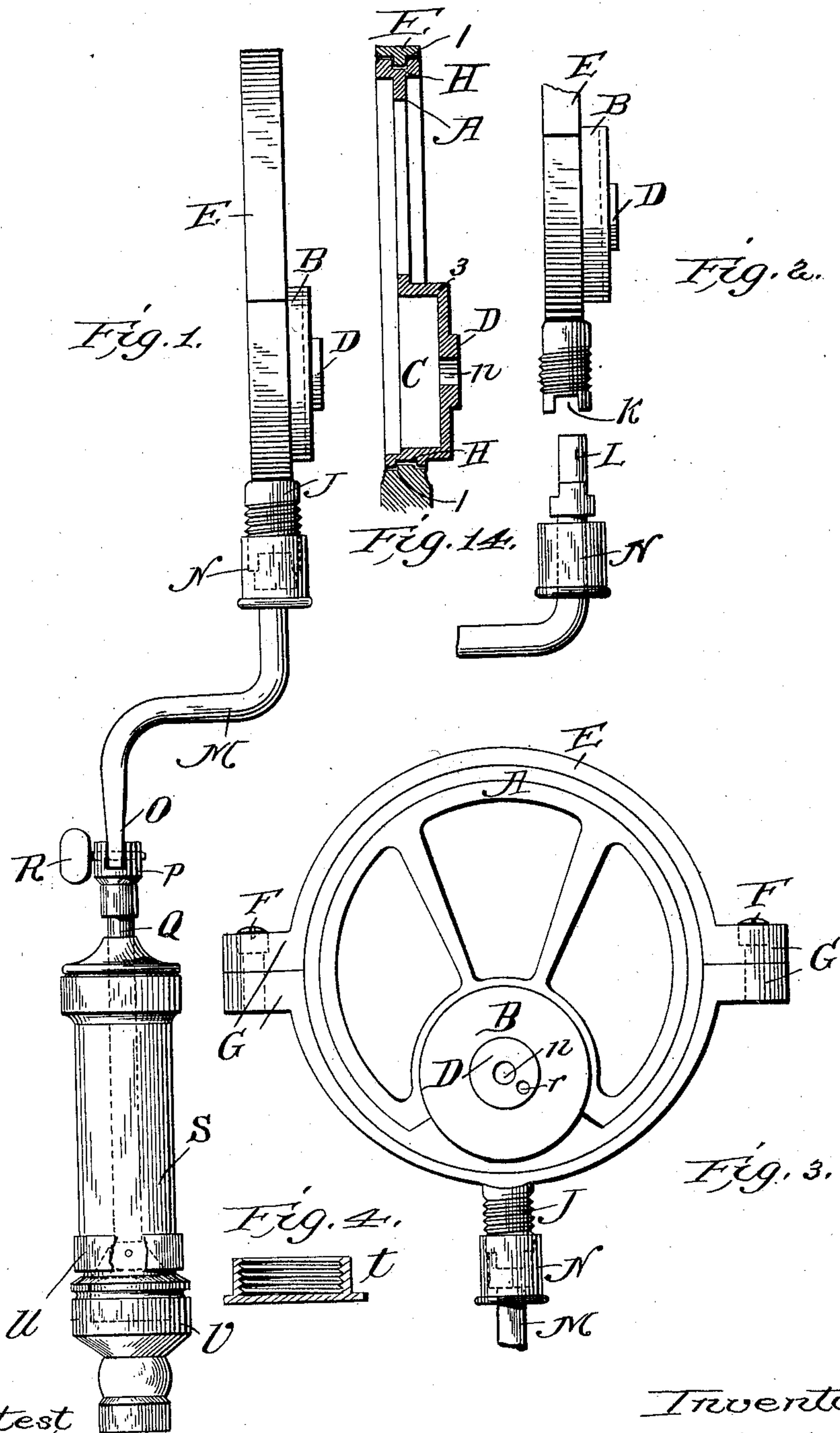
2 Sheets—Sheet 1.

A. GROSS.

PUMP FOR INFLATING PNEUMATIC TIRES.

No. 603,634.

Patented May 10, 1898.



Attest  
*Walter D. Madsen*  
C. S. Middleton

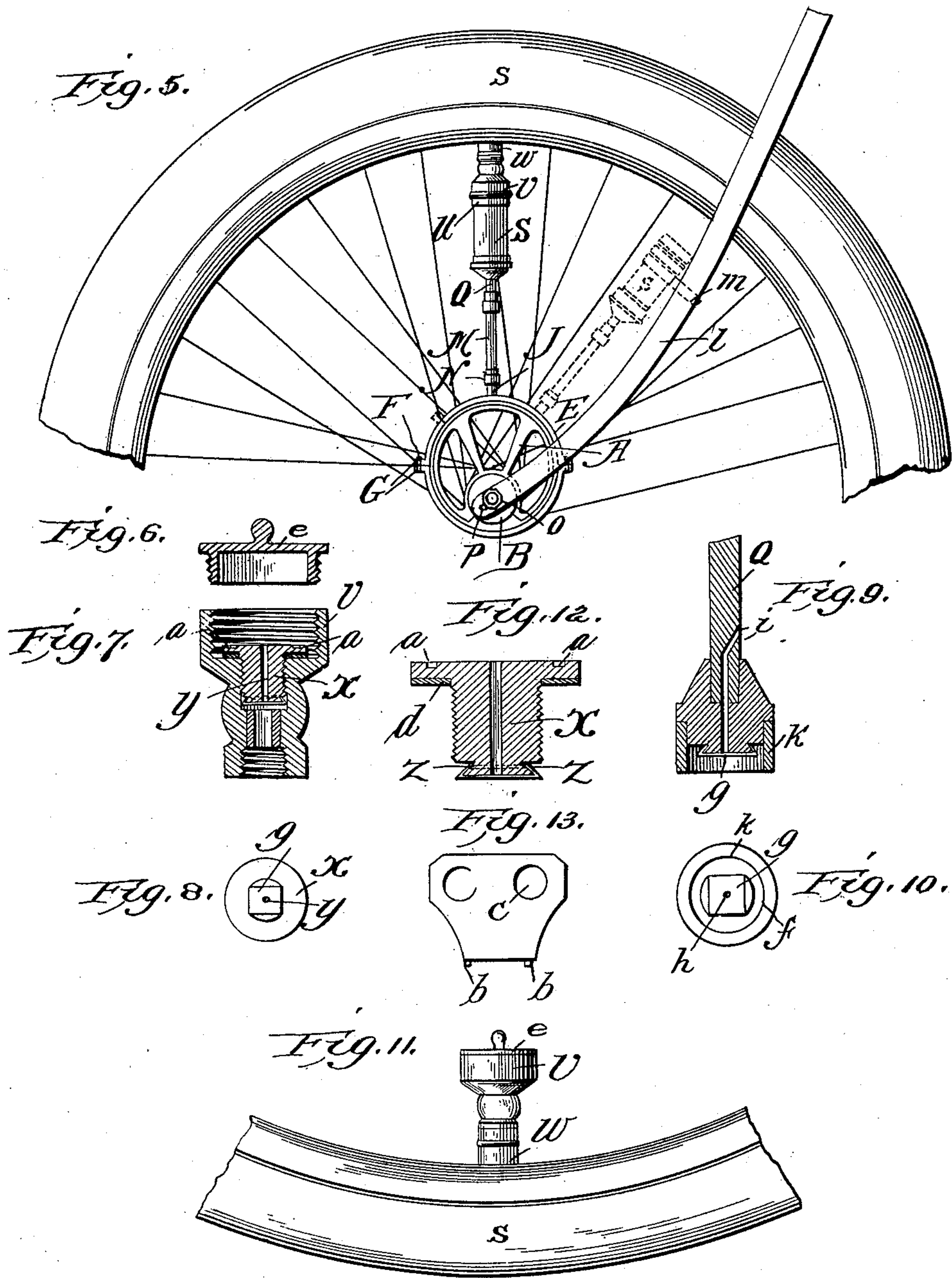
Inventor  
Augustus Gross  
by *Richard & Co.*  
Attys.

A. GROSS.

PUMP FOR INFLATING PNEUMATIC TIRES.

No. 603,634.

Patented May 10, 1898.



Attest  
J. M. Donaldson  
C. S. Middleton

Inventor  
Augustus Gross  
by Richards & Co.  
Attys.



# UNITED STATES PATENT OFFICE.

AUGUSTUS GROSS, OF SYDNEY, NEW SOUTH WALES.

## PUMP FOR INFLATING PNEUMATIC TIRES.

SPECIFICATION forming part of Letters Patent No. 603,634, dated May 10, 1898.

Application filed November 26, 1897. Serial No. 659,918. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUSTUS GROSS, engineer, a subject of the Queen of Great Britain, residing at Sydney, in the Colony of New South Wales, have invented certain new and useful Improvements in or Relating to Automatic-Action Pumps for Inflating Pneumatic Tires of Cycles and other Vehicles, of which the following is a specification.

10 This invention relates to a novel device for automatically inflating pneumatic tires of all classes of vehicles; and it consists, essentially, of a stationary eccentric disk having a hub-cavity secured to the axle and an eccentric ring placed around the said disk and connected to the piston of an air-pump attached to the valve and adapted to be operated by the rotation of the vehicle-wheel; but in order that this invention may be fully understood reference will now be made to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation of this invention detached from the vehicle. Fig. 2 is a fragmentary detail showing method of attaching the connecting-rod to the eccentric ring. Fig. 3 is a front elevation of the eccentric disk and ring. Fig. 4 is a sectional elevation of dust-cap for pump-barrel. Fig. 5 is a front elevation of this invention attached to the pilot-wheel of a bicycle. Fig. 6 is a sectional elevation of dust-cap for exhaust-valve. Fig. 7 is a sectional elevation of exhaust-valve. Fig. 8 is a view of the valve-plug looking upward. Fig. 9 is a sectional elevation of the piston-head. Fig. 10 is a view of the piston-head looking upward, showing valve. Fig. 11 is an elevation of the exhaust-valve attached to cycle-wheel and having the dust-cap on. Fig. 12 is an enlarged sectional elevation of the exhaust-valve plug. Fig. 13 is an elevation of a key for removing or securing the exhaust-valve plug. Fig. 14 is a central vertical sectional elevation of Fig. 3.

45 In all figures similar letters are used to denote similar parts.

A is an eccentric disk having a boss or projection B, in which the hub-cavity C is formed. A smaller central boss D is formed on the outer face of B. Two half-rings E E are placed around the disk A and held in position by the screws F F, passed through the flanges G G. In the periphery of the disk A is formed central groove H to receive the tongue I of the

half-rings E E. One of the half-rings E E is provided with a short pendent rod J, having a keyway K, adapted to receive the end L of the connecting-rod M. The cap N, threaded internally, screws onto the pendent rod J when the end L of the connecting-rod M is inserted into the rod J, as shown in Fig. 1. The connecting-rod M is shown disconnected from the rod J in Fig. 2. The connecting-rod M has a double bend and the lower end O is flattened, so as to be received in the forked end P of the piston Q and held secure by the thumb-screw R.

S is the pump-barrel, provided with a small opening T, covered with the rubber band U to form a safety-valve against overinflation.

The end of the pump S is screwed into the exhaust-valve casing V. The lower end of the exhaust-valve is attached to the tube W, provided in the tire. The exhaust-valve consists of the casing V, Fig. 7, into which is inserted the plug X. This plug is provided with a central air-passage Y, the lower end of which is covered with a strip of oiled silk or other suitable material that will withstand the required pressure. This strip of oiled silk g is secured over the lower face of the plug X and fastened by a thread passed around the recess Z in the lower end of the plug. To remove the plug X, keyholes a a are provided in the upper face to receive the keys b b, so that by the handle c the plug may be unscrewed and removed. When the plug is inserted, the leather or other washer d is necessary to make the connection air-tight. A dust-cap e is provided for the exhaust-valve when the pump is disconnected.

The valve in the piston-head f is constructed in a similar manner to that described above in the valve-plug X. The piston-head is provided with the air-passage h, which passes up through part of the piston Q and has an inlet-orifice at i.

k is the packing on the piston-head.

Fig. 5 shows this invention attached to the pilot-wheel of a bicycle, the pump being ready for operation. When it is desirable to disconnect the pump it is unscrewed from the exhaust-valve and brought over against the front fork l and held by a rubber band m. The pump in this position is shown by dotted lines in Fig. 5.

The method of attaching this invention to the pilot-wheel of a bicycle would be as fol-



lows: The front fork *l* would be disconnected  
 on one side from the axle and the disk A would  
 be passed in between the fork and the spokes,  
 the hub passing into the hub-cavity C, the  
 5 latter being sufficiently large to permit of the  
 hub revolving therein. The axle is passed  
 through the opening *n* and through the fork  
*l* and then secured by the nut *o* in the usual  
 manner. To keep the disk A stationary, a  
 10 small stud *p* passes through the fork *l* and  
 into the opening *r* provided in the boss D.  
 One end of the connecting-rod M is then at-  
 tached to the pendant J, as before described.  
 The other end is secured to the piston Q and  
 15 the pump and valve secured in position. The  
 device being now attached, as the wheel *s* re-  
 volves it will cause through the intervention  
 of the stationary disk A and the ring E the  
 piston Q to operate and pump the air through  
 20 the exhaust-valve, which in passing down the  
 air-passage Y will force the oiled silk *g* down-  
 ward and escape into the tire. The back pres-  
 sure will cause the oiled silk *g* to close the  
 air-passage Y until more air is forced in by  
 25 the pump. The pump is supplied with air  
 through the passage *h* on the outward move-  
 ment of the piston. The inward movement  
 of the same compresses the air in the pump-  
 barrel S, closes the valve in the piston-head,  
 30 opens the valve in the plug X, and forces the  
 air into the tire. To prevent the tire being  
 overinflated, the valve T is provided in the  
 pump-barrel S, so that when the air-pressure  
 in the tire is sufficient the back pressure on  
 35 the valve in the plug X will keep the same  
 closed. The compressed air would pass out of  
 the pump through the valve T instead of into  
 the tire, the pressure in the tire being regu-  
 lated by the strength of the rubber band U.  
 40 When the tire is sufficiently inflated, the  
 pump-barrel is disconnected from the ex-  
 haust-valve and the dust-cap *e* placed on the  
 valve, the dust-cap *t* placed on the pump-  
 barrel and the pump brought into the posi-  
 45 tion shown by dotted lines in Fig. 5 and held  
 there by the rubber band *m*, as before de-  
 scribed.

A modification may be made by perma-  
 nently attaching the connecting-rod M to the  
 50 piston Q, thus doing away with the thumb-  
 screw R.

In the construction of my invention any  
 suitable metal may be used, and the pump  
 may be attached to any suitable exhaust-  
 55 valve.

This invention may be applied to all classes  
 of vehicles using pneumatic tires, and in the  
 case of cycles the hub-cavity would be re-  
 quired of a suitable size so as to freely admit  
 60 the hub. It may also be applied to large ve-  
 hicles, when all the parts would be construct-  
 ed proportionately large. When so applied,  
 the eccentric portion of my device would be  
 placed between the wheel and the body of the  
 65 vehicle, and the opening *n* would be of suf-  
 ficient size to permit of the stationary axle  
 passing through, and the disk secured to the

shoulder of the said axle by passing one or  
 more small bolts through the shoulder and  
 the disk. This would be the method of at- 70  
 taching my invention to axles of the present  
 day; but if axles were constructed specially  
 such axles should be provided with a second  
 shoulder having a left-handed thread or screw,  
 75 and the opening *n* in the disk should be pro-  
 vided with a like thread, so that when the  
 disk is screwed home it will not be liable to  
 be slackened by the rotation of the wheel.  
 The operation of the pump in the case of large  
 vehicles would be precisely similar to that 80  
 when used for cycles; but in all cases the disk  
 must lie close to the spokes of the wheel.

I am aware that other devices have been  
 invented for automatically inflating pneu- 85  
 matic tires, and in some instances an eccen-  
 tric motion has been used to actuate the  
 pump-piston. I therefore do not claim the  
 use of an eccentric broadly; but my inven-  
 tion lies in the simplicity of construction and  
 ease of application, as my invention may be 90  
 applied to any vehicle of the present day with-  
 out alteration excepting the securing of the  
 disk so as to maintain the same in a station-  
 ary position. It is not intended in the use  
 of my invention that the pump shall be kept 95  
 constantly at work, but is only for use when  
 it is required to inflate the tire. This may be  
 done by either attaching the device and rid-  
 ing the cycle or propelling the vehicle along,  
 so as to operate the pump and inflate the tire, 100  
 or the cycle or vehicle may be supported and  
 the wheel rotated to effect the same purpose.

Having now particularly described and as-  
 certained the nature of my said invention and  
 in what manner the same is to be performed, 105  
 I declare that what I claim is—

1. In an apparatus for automatically inflat-  
 ing tires the combination with the tire-tube,  
 the valve-casing V connected with said tube  
 and having an open end, the tire-pump hav- 110  
 ing an open end adapted to be connected with  
 the open end of the valve-casing, the pump-  
 piston playing through the opposite end of  
 said pump and means for reciprocating the  
 pump-piston as the bicycle-wheel rotates, sub- 115  
 stantially as described.

2. In combination with the tire-tube, the  
 valve-casing connected therewith, said casing  
 having an enlarged open end, a pump having  
 an open end threaded to engage the open end 120  
 of the valve-casing, the plug threaded into  
 the valve-casing and having grooved lower  
 edge and central passage, the flexible band  
 extending across the passage and having its  
 ends secured to said grooved edges and means 125  
 for operating the pump-piston as the wheel  
 rotates, substantially as described.

In witness whereof I have hereunto set my  
 hand in presence of two witnesses.

AUGUSTUS GROSS.

In presence of—

WILLIAM SPRINGTHORPE DOMEL,  
 THOMAS WILLIAM MILLER.