

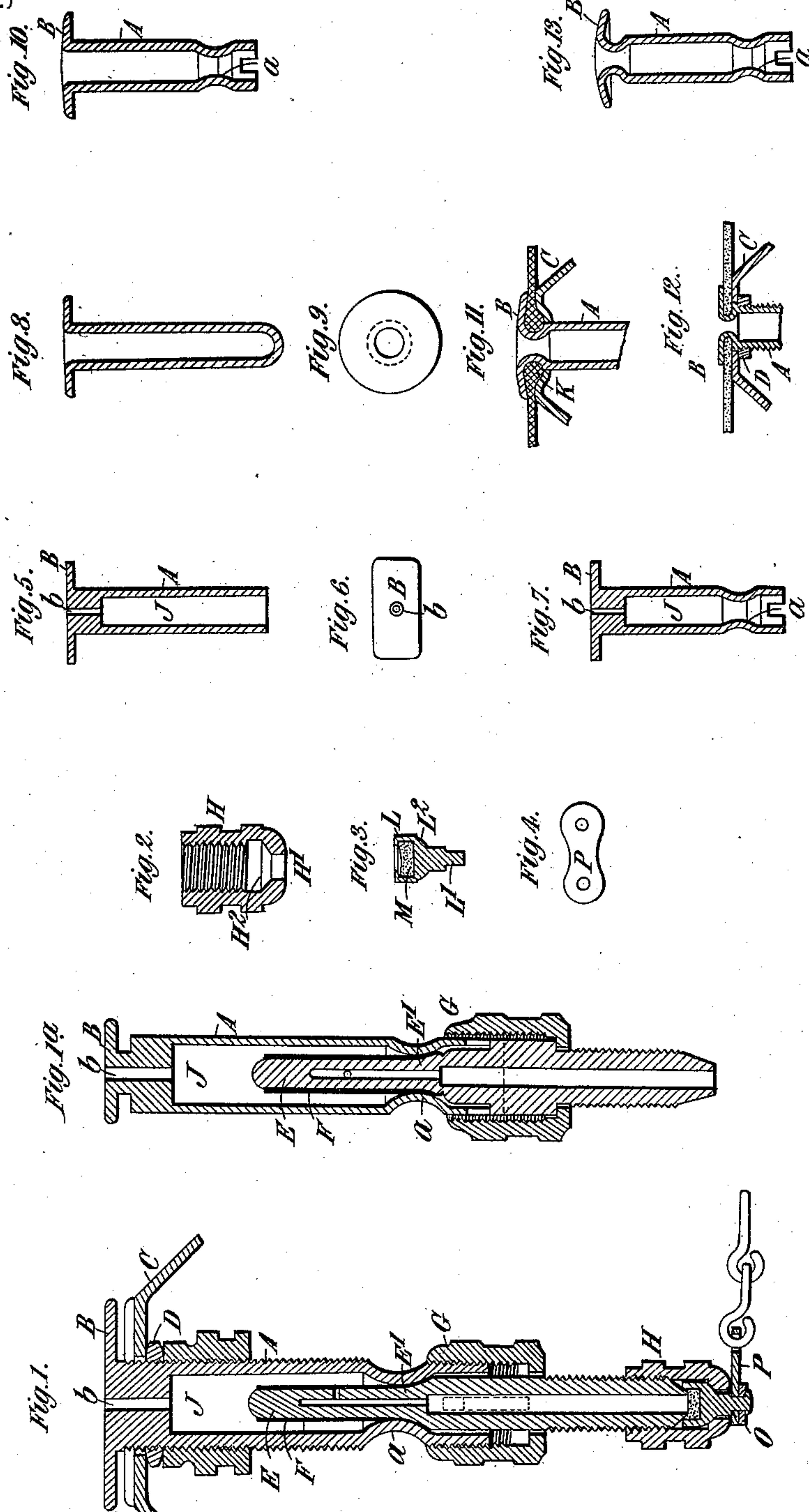
No. 613,917.

Patented Nov. 8, 1898.

C. K. WELCH.
AIR VALVE FOR PNEUMATIC TIRES.

(Application filed Dec. 24, 1896.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES KINGSTON WELCH, OF COVENTRY, ENGLAND.

AIR-VALVE FOR PNEUMATIC TIRES.

SPECIFICATION forming part of Letters Patent No. 613,917, dated November 8, 1898.

Application filed December 24, 1896. Serial No. 616,849. (No model.)

To all whom it may concern:

Be it known that I, CHARLES KINGSTON WELCH, engineer, a subject of the Queen of Great Britain, residing at Park House, Coventry, in the county of Warwick, England, have invented certain new and useful Improvements in or Relating to Air-Valves for Pneumatic Tires, of which the following is a specification, reference being had to the accompanying drawings.

I have obtained patents for this invention in the following countries, to wit: Great Britain, August 6, 1896, No. 17,392; France, August 24, 1896, No. 259,122; Belgium, August 25, 1896, No. 123,199; Austria, March 4, 1897, No. 47/739; Switzerland, August 26, 1896, No. 12,916; Denmark, June 16, 1897, No. 1,136; Norway, December 17, 1896, No. 5,824; Italy, August 29, 1896, No. 83/194; Russia, March 13, 1898, No. 653; Finland, February 15, 1897, No. 693; Hungary, December 18, 1896, No. 8,402; Luxemburg, December 17, 1896, No. 2,702; Portugal, December 22, 1896, No. 32; Turkey, December 21, 1896, No. 555; Spain, February 18, 1897, No. 20,115; Malta and Gozo, March 11, 1897, No. 22; New South Wales, January 18, 1897, No. 7,204; South Australia, January 14, 1897, No. 3,523; Victoria, January 16, 1897, No. 13,873; West Australia, January 27, 1897, No. 1,494; Queensland, January 19, 1897, No. 3,722; New Zealand, January 21, 1897, No. 9,210; Tasmania, January 19, 1897, No. 1,812; Egypt, November 3, 1897, No. 88/XXII; Chile, July 23, 1897; Argentine Republic, October 23, 1897, No. 2,095; Barbadoes, January 11, 1897; Brazil, January 15, 1898, No. 2,178; Cape of Good Hope, January 4, 1897, No. 1,273; Natal, January 4, 1897, No. 19; Orange Free State, May 5, 1897, No. 112; Transvaal, January 22, 1897, No. 1,307; Hong-Kong, November 29, 1897; India, January 2, 1897, No. 2; Jamaica, February 26, 1897; Mexico, July 13, 1897, No. 1,046; Newfoundland, January 26, 1897; Bahama Islands, April 30, 1897, No. 4; Borneo, January 11, 1898, No. 22; Canada, January 22, 1897, No. 54,716; Ceylon, January 4, 1897, No. 539; Channel Islands: The British Patent No. 17,392, 1896, has been registered in Jersey February 10, 1897, and Guernsey January 11, 1897.

This invention relates to air-valves for pneu-

matic tires and comprises certain improvements in valves of the kind or class wherein the valve proper consists of an india-rubber tube mounted on a perforated stem or plug which is removably secured in a tubular body. In valves of this type as usually constructed a shoulder is provided in the tubular body to form a seat for an enlarged or conical part of the perforated stem or plug, the interior of the tubular body between the said shoulder and the head or inner end of the body being made sufficiently large by boring the same from the inner end to allow room for the india-rubber valve-tube to expand when air is being forced through the valve. By this method of construction a large thoroughfare is formed in the head of the tubular body, and the said head is necessarily made unduly large, which it is desirable to avoid, especially in valves intended for narrow wheel-rims.

According to the present invention the enlarged passage is provided in the tubular body to allow room for the valve-tube to expand when required, and still a small hole only is formed in the head of the tubular body, whereby the risk of the india-rubber tube being blown into the tire and so lost is avoided, and a small or narrow head can be employed, which is very desirable, as it allows of a narrow wheel-rim being used. For this purpose I, according to one method of construction, bore the tubular body from the outer end to make the large opening for receiving the valve-stem, and I then form the required internal shoulder or seat for the valve stem or plug by contracting a portion of the tubular body in any suitable manner. I sometimes apply this method for the purpose of forming the contraction of the body at the inner end whether the aperture in the body is produced by boring or by stamping.

Referring to the accompanying drawings, Figure 1 is a longitudinal central section of a complete valve constructed according to my present invention. Fig. 1^a is a longitudinal section taken at right angles to the section in Fig. 1. Fig. 2 is an enlarged central longitudinal section of the body of the dust-cap. Fig. 3 is a similar section of the loose valve of the dust-cap. Fig. 4 is a plan of the link for connecting the dust-cap to its chain. Fig. 5 is a section of the tubular valve-body be-

fore the internal shoulder has been formed therein. Fig. 6 is a plan of the head of said tubular body. Fig. 7 is a section showing a later stage of manufacture, the internal shoulder having been formed. Fig. 8 is a longitudinal section of a tubular blank produced by stamping in a well-known manner. Fig. 9 is a plan of the flanged head of the said blank. Fig. 10 is a section of the blank after the closed end has been cut off and the internal shoulder produced by contracting the tube. Fig. 11 is a longitudinal section of the inner end of a valve-body having a contraction produced at the head, as hereinafter described, and showing a portion of the air-tube of the tire having a beaded edge around the valve-hole. Fig. 12 is a similar section showing a head of slightly different shape adapted for an air-tube not having a beaded edge around the valve-hole. Fig. 13 is a longitudinal section of a tubular valve-body having a contraction at the head and another lower down in the body formed by the method hereinafter described.

Like letters denote corresponding parts in the several figures.

A is the tubular valve-body. B is the head thereof. C is the washer, between which and the head B the inflatable air-tube of the tire is secured by tightening up the nut D in the usual manner.

E, Fig. 1, is the perforated valve-stem or plug upon which the india-rubber valve-tube F is placed.

G is the nut for securing the stem E in the body A, as heretofore.

H is the dust-cap.

In the manufacture of my improved tubular valve-body, according to one method, I bore in the cylindrical part thereof, from the inner end up to a point near the head, a large hole J, as seen in Fig. 5, having a diameter greater than the external diameter of the india-rubber valve-tube F, and I drill the small hole *b* through the head to form the communication with the interior of the air-tube of the tire. I then produce an internal shoulder *a*, Fig. 7, in the tubular body to form a seat for the enlarged or conical part E' of the valve stem or plug by contracting the said body. The contraction may be produced in any suitable manner—for example, by pressing a suitable tool or roller or rollers against the tubular body while the latter is revolving in a lathe. I preferably insert a suitably-shaped mandrel in the tubular body while the contraction is being effected to insure the correct internal size and shape and to produce a very smooth shoulder suitable for forming a seat for the india-rubber tube on the enlarged part of the valve stem or plug. The tubular body is then screw-threaded externally and otherwise finished in the ordinary manner. It will be seen from Fig. 1 that there is ample room in the tubular body between the shoulder *a* and the head B for the india-rubber tube to expand when air is

being forced through the valve, and at the same time there is no risk of the said tube being blown into the tire and so lost.

In Fig. 8 I have shown a tubular blank, produced by stamping in a well-known manner, and Fig. 10 shows the same tube after the closed end has been cut off and the internal shoulder *a* formed in it by contracting the tube as above described. This mode of making the valve-body is very advantageous; inasmuch as the tube can be reduced to the desired thickness entirely by stamping, thus avoiding boring the tube and saving labor and material. It is obvious, however, that the contracted part may be equally well formed in a tube in which the internal aperture is produced by boring and not by stamping. I sometimes apply this method for producing the contracted opening in the head of the tubular body. For this purpose I take a valve-body having the internal aperture produced by stamping or by boring and I contract the body just under the head, in the manner above described, so as to produce the results shown in Figs. 11 and 12. In Fig. 11 the external groove formed in the body by this process is adapted to receive the thickened or beaded edge K of the air-tube, whereby ample hold or grip is obtained on the air-tube by a valve-tube having a narrow head. The beaded edge K is formed by molding or otherwise during the process of manufacture of the tube. In Fig. 12 the edge of the air-tube around the valve-hole is not thickened or beaded, the hole being simply produced by puncturing the tube in the usual manner, and consequently the groove in the valve-body A is not made as wide as that in Fig. 11.

In Fig. 13 I have shown a tubular valve-body having the contraction at the head and the internal shoulder forming the seat for the valve-stem both produced by the method of contracting the tubular body as above described.

It is obvious that the above-described mode of producing the seating by contracting the valve-body may be employed in any valve similar to that shown in Fig. 1, requiring an internal seat or reduced head.

I employ a dust-cap which is furnished with a loose revolving valve-seat, so that in the act of screwing the cap tight against the conical outer end of the valve-stem forming the pump connection there may be no tendency to dislodge the leather or other washer in the cap. For this purpose the cup L, Fig. 3, in which the washer M is secured, is furnished with a stem L', that passes loosely through a hole H', Fig. 2, in the end of the cap H and is secured in place by riveting the end of the stem over a washer O, Fig. 1. The part L², Fig. 3, of the back of the cup L is made ball-shaped or rounded to bear against the curved or recessed bottom H², Fig. 2, of the cap, so that the cup can accommodate itself readily to any position required to allow the washer M to bear properly against the end of the

pump connection, and so make a more reliable safeguard against leakage than has been heretofore possible.

I attach the cap to the usual retaining-chain by means of a loose revoluble link P, mounted loosely on the stem L' of the cup L. Instead of attaching the chain to a spoke of the wheel, as is commonly done, I sometimes link it on the contracted part of the tubular body A. In large valves where a chain is not used the revoluble link P may be dispensed with.

I secure the washer M in the cup L by turning the rim of the cup inwardly over the washer to form a flange, as indicated in Fig. 3. This mode of securing the washer may be adopted in those instances where the cup is rigidly fixed in the cap.

What I claim is—

1. A tubular valve body or casing composed of a single piece of metal and having a contracted passage through its head, an internal shoulder constituting a valve-seat and formed by a contraction of the said body or casing, and an intermediate chamber or bore of greater diameter than the passage through

the head and shoulder, in combination with a valve-stem seated on the said shoulder and extending through the same into the intermediate chamber in the casing, as set forth.

2. A tubular valve body or casing having a small passage through its head, an internal shoulder constituting a seat for the valve-stem and an intermediate bore of greater diameter than the passages through the head and valve-seat, the said body or casing being a metal tube contracted at the head and valve-seat, as set forth.

3. The combination with the tubular valve-body having a contracted portion immediately under the head or flange, of an air-tube molded with a bead around the edge of the hole through which the valve-body passes, as set forth.

In testimony whereof I have hereunto set my hand this 26th day of November, 1896.

CHARLES KINGSTON WELCH.

Witnesses:

ARTHUR A. BERGIN,
PAUL DEVIN.