

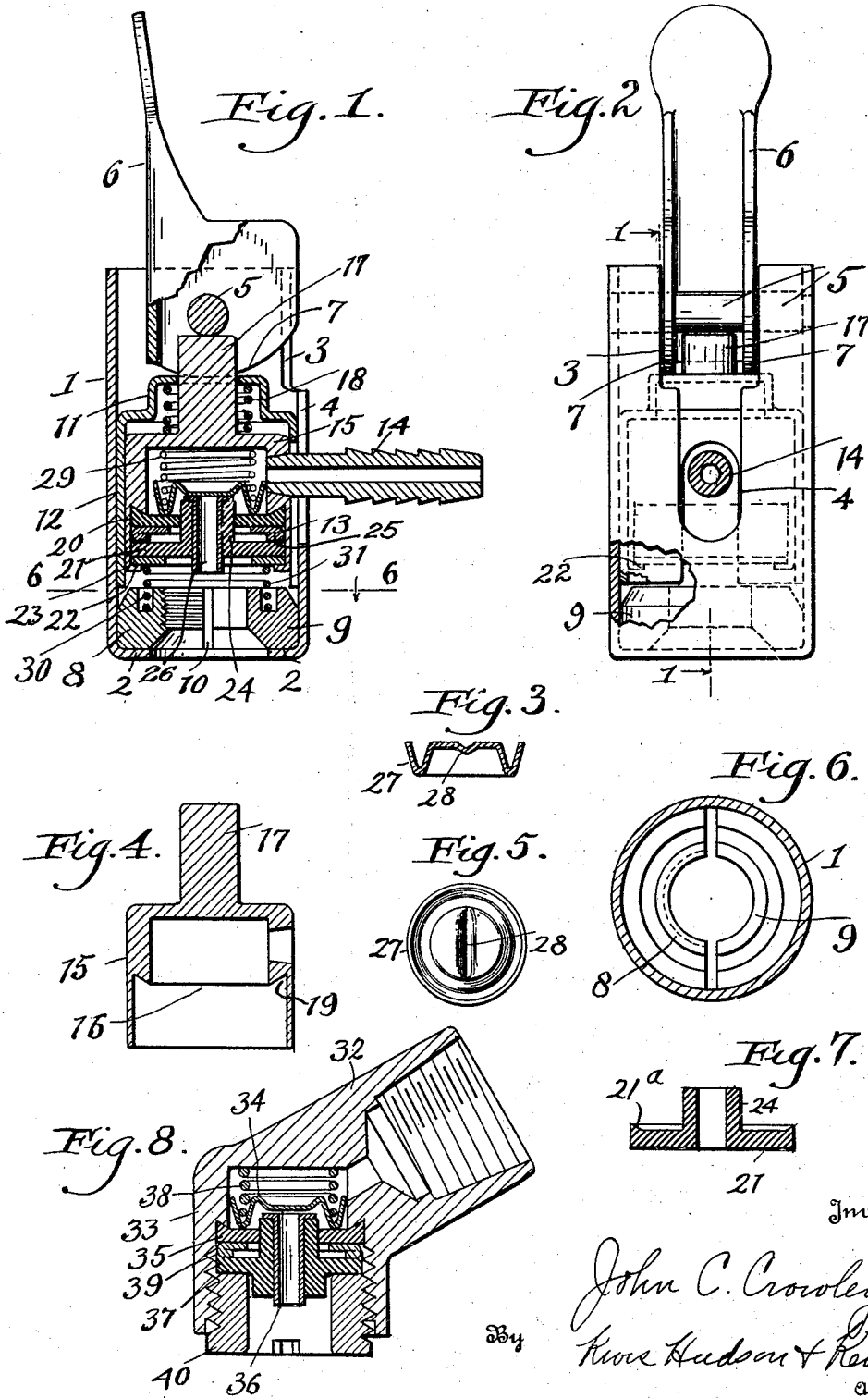
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AIR CHUCK

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AIR CHUCK

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This invention relates to an air chuck particularly adapted to be used in connection with an air hose for inflating a rubber article, such as a pneumatic tire, although, of course, not limited alone to this use.

Air chucks are very commonly employed in connection with air pressure systems in garages, service stations and similar places, where they are continually exposed so that customers may apply them directly to the valve stems of tires. Since such chucks are subjected to public use of this character, they naturally receive severe treatment and rough usage and must be strongly constructed and not easily broken or rendered inoperative. It is also necessary that a chuck of this nature be provided with an efficient valve for preventing the escape of air from the hose line when the device is not in use, and that such valve be readily responsive to movement from its seat when the device is applied to a valve stem.

An object of this invention is to provide an air chuck of simple construction, formed of a relatively few number of parts and of such strength that it will easily withstand the treatment to which it is subjected in every-day use.

Another object is to provide an air chuck in which an efficient valve is arranged, capable of preventing the escape of air from the hose line when the chuck is not in use yet readily responsive to be unseated when it is desired to connect the chuck to the valve stem of the receptacle to which it is to be applied.

Additional objects and advantages will become apparent as the description proceeds.

Embodiments of the invention are illustrated in the accompanying drawing, wherein

Figure 1 is a transverse vertical section of one form of the invention taken on the line 1—1 of Figure 2.

Figure 2 is an elevational view of this form, a portion of the casing being broken away to show certain of the parts.

Figure 3 is a detail of the valve.

Figure 4 is a detail of one of the structural parts of this form of the device.

Figure 5 is a top plan view of the valve.

Figure 6 is a horizontal sectional view taken on the line 6—6 of Figure 1.

Figure 7 is a detail view of one of the elements of the device, and

Figure 8 is a transverse vertical section of a modified form.

In the form shown in Figures 1 to 6 the chuck is combined with a clamping arrangement whereby it may be held in connection with the valve stem to which it is to be applied. As shown in this form, the device comprises a cylindrical casing 1, open at its upper end and turned inwardly at its lower end to form the annular flange 2. A longitudinal slot is provided on the side of the casing and extends from the open upper end to a point below where the nipple 14 of the hose line enters the same, such slot having an enlarged upper portion 3 and a reduced lower portion 4.

The casing carries a transversely extending pin 5 arranged adjacent its upper end, upon which is pivotally mounted an operating lever 6, the inner end of which has a cam portion 7. At the lower end of the casing is arranged a valve stem engaging chuck formed of two complementary substantially semi-cylindrical nuts 8 and 9. These nuts in their inoperative position are separated by a space 10. A slidable sleeve is arranged within the casing between the pin 5 and the chuck and is formed of an open end cylinder having a reduced upper part 11 and an enlarged lower part 12. This sleeve is provided with an elongated slot 13 adapted to align with the slot 4 in the casing and to permit of the passage therethrough of the air hose nipple 14. The relationship of the reduced upper part 11 and the enlarged lower part 12 of the slidable sleeve is such that the connecting part of the sleeve forms an annular shoulder. Within the sleeve a valve housing member is arranged, being formed of an enlarged lower portion 15 having a central chamber 16 and an upper stem portion 17 adapted to extend through the upper wall of the reduced portion 11 of the slidable sleeve. Surrounding this stem portion 17 and arranged between the upper side of

the enlarged portion 15 and the under side of the top wall of the part 11 of the sleeve is a spring 18. The inner walls of the part 15 of the valve housing member within the chamber 16 are recessed at 19 to receive annular valve packing disks 20 and 21. The lower end of the wall of the part 15 is flanged inwardly at 22 so as to retain said valve packing washers in position, there being a washer bearing member 23 arranged between such flange and the packing 21. The packing 21 has a centrally disposed upwardly extending stem part 24 passing through a central opening in the packing 20 and into the interior of the valve housing member and with an annular portion having an upwardly extending annular rib 21a while the packing 20 is provided with an annular tenon 20a engaging in a corresponding part of the recess 19. An annular spring spacing washer 25 is arranged between the two packing elements 20 and 21, this washer resting on and compressing the rib 21a when the chuck is assembled. The stem part 24 of the packing 21 is provided with a longitudinally extending bore within which is arranged a bushing 26 having an upper annular flange resting upon the top of the stem and its lower end projecting downwardly beyond the lower side of the packing 21 and the washer 23. This bushing is adapted to engage within the valve stem of the receptacle to which the device is to be attached.

Within the valve housing member is a valve member proper, which member is adapted to seat on the upper side of the upper packing 20. This valve member proper comprises preferably a sheet metal disk having an annular depressed V-like groove 27 adjacent to its outer circumference, and a transversely extending depressed V-like groove portion 28 located at its center but of the same length as the diameter of the annular flange on the bushing 26. When the valve is in closed position the lower edge of the annular depressed groove 27 is adapted to seat on the packing 20, while the V-shaped depression 28 is above and separated from the annular flange of the bushing 26. A spring 29 is arranged within the valve housing member and has one end seated within the depression 27 of the valve and its other end abutting against the upper side of the chamber within the valve housing member. This spring normally maintains the valve in seated position with the depressed groove 27 engaging the packing 20.

The upper side of each of the chuck members or nuts 8 and 9 is provided with complementary grooves 30 forming an annular seat for a spring 31 which bears against the under side of the washer member 23 carried by the valve housing member, and adjacent their circumference with a taper

adapted to coact with the lower end of the sleeve.

In the form shown in Figure 8 the valve arrangement is identical with that above disclosed but the clamping device is omitted therefrom. In other words, this form is simply in the nature of the ordinary chuck to be found on air hose lines. It is made up of an air chuck body which, in this instance, comprises the hose attaching portion 32 and the valve housing member 33, within which is arranged the valve 34, corresponding to the valve in the previously described form adapted to seat upon an upper packing member 35 and be upwardly separated from the annular flange of the bushing 36 which extends through the stem of the lower packing element 37.

As in the previous form the valve is urged into contact with its seat by a spring 38 engaging in the annular depression of the valve and abutting the under side of the opening in the valve housing member. The packing members 35 and 37, together with the interposed compressible washer 39, are held in compressed relationship within the valve housing member by a threaded nut 40 which, in this instance, is the valve stem attaching nut or chuck.

When the chuck, of the form shown in Figures 1 to 6, is applied to a valve stem, the parts being in the position indicated in Figure 1, and the handle 6 swung downwardly, the cam surface 7 thereof will engage the upper side of the part 11 of the slidable sleeve. The sleeve will thus be depressed against the tension of the spring 18 until its lower edge engages the taper of the upper circumferential edge of the chuck members 8 and 9. The chuck members will thus be forced together upon the valve stem. Since the groove 30 in the top of the chuck members is made wider than the thickness of the spring, this movement of such members is permitted, while the spring will tend to separate the members as soon as the handle 6 is swung upwardly and the slidable sleeve responds to the spring 18. The annular shoulder between the portions 11 and 12 of the sleeve will engage the part 15 of the valve housing member to limit downward movement of the sleeve. Also these same parts will limit upward movement of the housing member within the sleeve as well as will the engagement of the part 17 with the pin 5. It should be noticed that the springs 18 and 31 maintain the parts under spring tension. As the chuck is clamped to the valve stem the bushing 26 will engage therein and cooperate therewith in a manner well understood in the art. This engagement with the valve stem will cause the valve proper to unseat from the packing 20 against the normal action of the spring 29 while the annular flange of the bushing will engage the under-

side of the depressed groove 28. The air in the hose then passes from the chamber in the valve housing member on opposite sides of the depression 28 through the bushing into the valve stem. The relationship of the bottom of the depression 27 of the valve and the depression 28 is such that the valve is readily displaced to allow the air to enter beneath it and to equalize the pressure on opposite sides thereof. The spring 29 is not of sufficient strength to seat the valve without a pressure differential. The chuck is retained in position upon the valve stem until the handle 6 is swung upwardly and the nuts 8 and 9 separated.

The operation of the chuck shown in Figure 8 is the same as in the one just described, except this chuck must be manually held in application to the valve stem.

Although preferred structural embodiments of the invention have been shown and described, it should be understood that the invention is not limited thereto, but may include such modifications and adaptations as fall within the scope of the appended claims.

Having thus described my invention what I claim as new is,

1. An air chuck comprising a valve housing member having a chambered head and an air inlet passage to said head, said chambered head having an opening, means cooperating with said opening forming a closure with a restricted opening, a sheaf metal valve member cooperating with the said closure means and controlling the passage of air through the opening therein, said valve having an annular offset depression and a rectilinear offset depression formed therein, the wall of said valve at the base of the annular depression being adapted to seat on said closure means, and a spring cooperating with the valve to normally maintain the wall of said valve at the base of said annular depression seated upon the closure means.

2. An air chuck comprising a valve housing member having a chambered head and an air inlet passage to said head, said chambered head having an opening, means cooperating with said opening forming a closure with a restricted opening, a valve member arranged in said closure having an annular offset depression and a rectilinear offset depression therein, the wall of said valve member at the base of said annular depression adapted to bear on said closure means circumferentially outside of the restricted opening, the wall of said valve member at the base of said rectilinear depression adapted to bear on said closure means and extend across said restricted opening when the chuck is applied to a valve stem, and a spring within the annular depression and cooperating with the chambered head to maintain the wall of said member at the base

of said depression in engagement with the closure means.

3. An air chuck comprising a valve housing member having a chambered head and an air inlet passage thereto, said chambered head having an opening, closure means for said opening having an opening the inner end of which is above the normal plane of said means, a valve arranged in said chambered head having an annular offset depression, the wall of said valve at the base of the annular depression being adapted to seat on said closure means circumferentially outside of said opening therein, a rectilinear offset depression formed in said valve with the valve wall at the base of said rectilinear depression being adapted to engage said closure means and extend across the opening therein when the chuck is applied to a valve stem, and a spring within said head and bearing against said valve within said annular depression to maintain the wall of said valve at the base of said annular depression in engagement with the closure means.

4. An air chuck comprising a valve housing member having a chambered head and an air inlet passage thereto, said head having an opening, closure means for said opening which is also provided with an opening, a member held in operative association with said closure means having a part extending through and above the opening therein provided with a passageway, a valve arranged in said head having a relatively narrow offset depression, the wall of said valve at the base of said depression being adapted to be engaged by the extended part of said last named member and to extend across the passageway therein when the chuck is applied to a valve stem, and a spring adapted to normally maintain said valve in engagement with its seat.

5. An air chuck comprising a valve housing member having a chambered head and an air inlet passage thereto, said head having an opening and the walls thereof being provided with a recess, closure means for said opening arranged in said recess and provided with an opening, a member also arranged in said recess and held in spaced operative association with said closure means, said last named member having a part provided with a passageway extending through and above the opening in said closure means, a valve arranged in said head having an annular offset depression, the wall of said valve at the base of said depression being adapted to normally seat on said closure means, said valve also having a relatively narrow rectilinear offset depression with its wall at the base of said depression adapted to engage the extended part of said last named member and to extend across the passageway therein when the chuck is applied to a valve stem, and a spring within the head seated in said annular

depression to maintain said valve in engagement with its seat.

6. An air chuck comprising a body having a hose attaching portion and a valve housing member, said member having a chambered head the inner walls of which are recessed, a closure means for said head arranged in said recess and having a restricted opening there-through, a member also arranged in said recess and having a part extending through and above the restricted opening in said closure means provided with a passageway, means cooperating with said housing member to adjustably maintain said closure means and said second named member in operative association, a bushing extending through the passageway in said second named member having an annular flange at its upper end, a valve arranged within said head having an offset annular depression, the wall of said valve in the base of said annular offset depression being adapted to normally bear on said closure means, said valve also having a rectilinear offset depression, the wall of said valve at the base of said rectilinear depression being adapted to bear on said annular flange of the bushing and to extend across the passageway in said second named member when the chuck is applied to a valve stem, and a spring within said head and seated in said annular depression of the valve to normally maintain said valve in engagement with its seat.

In testimony whereof, I hereunto affix my signature.

JOHN C. CROWLEY.

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