Dec. 20, 1955 R. H. BLACKFORD 2,727,531

VALVE GUARDS

Filed Aug. 24, 1949

FIG_1_

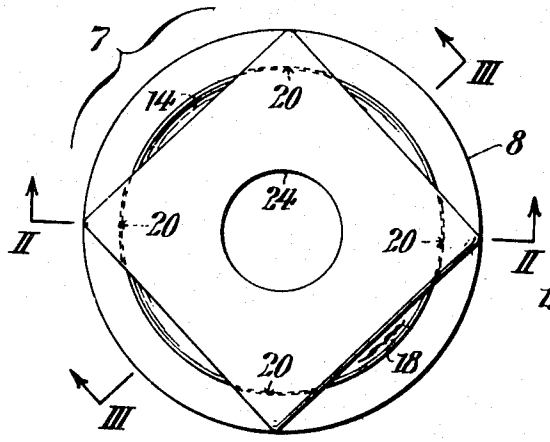


FIG_4_

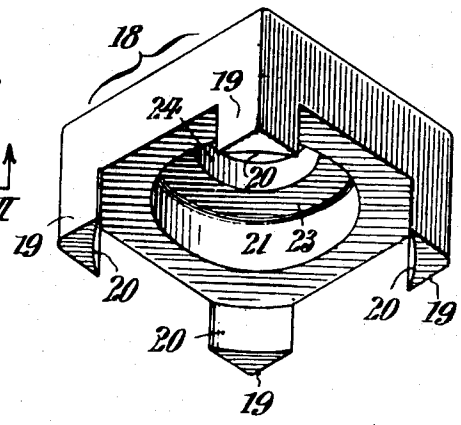


FIG_2_

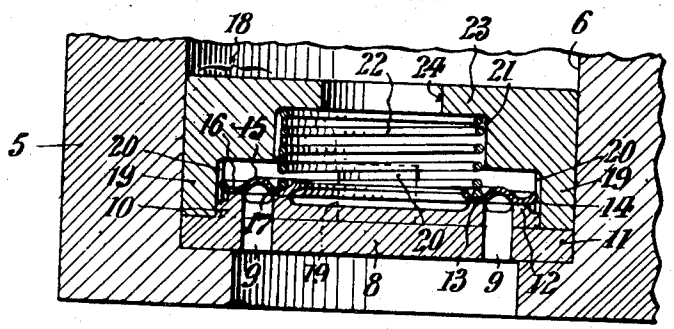
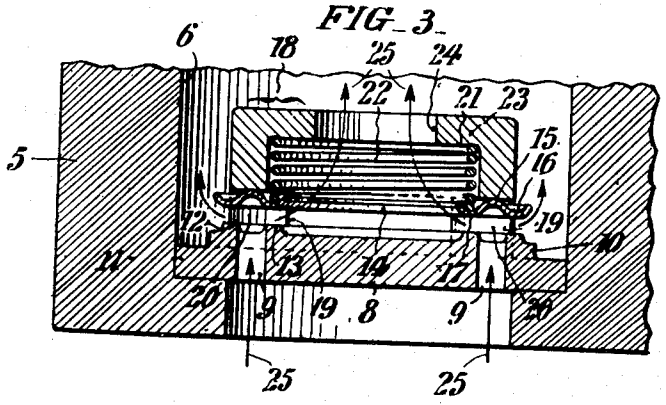


FIG_3_



WITNESSES

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VALVE GUARDS

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4 Claims. (Cl. 137—516.13)

This invention has general reference to check valves and, more particularly, the species or forms thereof commonly fitted into compressors, pumps and other pressure fluid cylinders; such valves being capable of operation responsively to suction or pressure pulses in opening and closing the valve ports.

Valves of the type referred and, more especially, those of the smaller sizes necessarily require very careful fabrication, with a precision finish, if they are to function accurately, and resultantly are expensive to produce, install, and operate.

A primary object of this invention is to overcome the just noted disadvantageous features by providing a valve of the species, above referred to, which can be economically produced with preassurance that it will function accurately as long as it remains in serviceable condition.

Another object is the provision and method of making a guard for valves of the above indicated type that is capable of production on a quantity basis, from predetermined cross-section bar stock, much more economically than heretofore possible.

A further object is the provision of a valve guard as indicated in the preceding paragraph which not only guides the valve, during opening and closing, but which likewise serves as a positive lift controlling stop, as well as housing and holding the valve influencing spring.

Further objects with ancillary advantages will hereinafter appear or be specifically noted, and to all of the recited ends, this invention essentially consists in the combination of elements, arrangement of the parts and features of construction, as well as the method of making the valve guard, substantially as hereinafter described and claimed in this specification and shown by the accompanying sheet of illustrative drawings, in which:

Fig. 1 is a top plan view of a typical valve unit assembly embodying the instant improvements.

Fig. 2 is a transverse sectional view taken on the plane II—II of Fig. 1, and showing the valve in closed position.

Fig. 3 is a similar sectional view to the preceding, taken as indicated by the arrows III—III in Fig. 1, and with the valve in open position.

Fig. 4 is a perspective view looking upwardly from below the valve guard of this invention.

In describing the form of the invention exemplified by the sheet of drawings herewith, specific terms will be employed for the sake of clarity, but it is to be understood the scope of said invention is not thereby limited; each such term being intended to embrace all equivalents which perform the same function for an analogous purpose.

Referring more in detail to the drawings the reference character **5**, Figs. 2 and 3, designates a fragmentary portion of a compressor cylinder head or deck that is provided with a plurality of socket borings **6**, one only being shown, for inset reception of the improved check valve, comprehensively designated **7**, in Fig. 1, of this invention. The valve **7** conveniently, although not essentially, comprises a seat component **8** having flow ports **9** and a central shouldering **10**, with a surrounding flange **11**, said

shouldering being appropriately fashioned to define an outer and an inner concentric valve seating surfaces **12**, **13**, respectively, for an annular type valve **14**. This valve **14**, it will be observed, cross-sectionally embodies an arched-ridge **15** intermediate concentric outer and inner annular seating portions **16**, **17**, respectively for coaction with the base seats **12**, **13**, in an obvious manner.

The valve **14** is guided in its movement by a novel form of unit, generally designated **18** in Fig. 4. This unit **18** is preferably made by machining from square-section bar stock by axial boring to a determinate diameter and extent so that only the diagonally-related angular-corner portions **19** remain to jointly provide diametrically opposed guide means for the valve **14**. It is to be particularly noted, at this juncture, that the diameter of the boring just referred to and its axial extent is such as to provide corner portions **19** of a definite length with the inner spacedly confronting arcual or concave faces **20** thereof adapted, at their free ends to snugly impinge the circumferential surface of the base shouldering **10** aforesaid. The guide and stop unit **18** is furthermore axially bored to a comparatively smaller diameter to provide a cylindrical housing **21** for a suitable spring **22** in compression between the inne rend wall **23**, of said housing and the inner seating portion **17** of the annular valve **14**; while the end wall **23** is provided with a central passage **24** for flow through the valve unit **7** as typically indicated by the arrows **25** in Fig. 3.

From the foregoing it is thought the merits and advantages of the improved check valve will be readily appreciated, but it is desired to herein particularly stress the method of making and the novel form of the combined valve guide and stop unit **18**, that not only efficiently guides the annular valve **14** during its opening and closing movements, but also functions as a positive lift limiting stop for said valve **14**, and which additionally serves as a housing for holding the spring **22** in correct functional relation with the valve **14**. In addition, by provision of the valve **14** with a relatively large center hole there is provided a greater effective valve area than would be the case if such hole were not used; while the holes set up by the spaced portions **19** materially aid free flow through the valve as an assembled unit. Another characterizing feature of this invention is the novel method of producing the unit **18**, preferably, from square section stock, in the manner hereinbefore explained to provide the integral corner arms or guide portions **19**, and thereby enabling exceedingly economic production of what might, obviously, be a difficult casting operation or an expensive forging matter.

Finally while there has hereinbefore been set forth that which has been found a preferable manner of carrying out the invention, the same is not to be considered in a limitative sense; for instance the cross-section of the bar stock may, obviously, be other than square, or polygonal; whereas the proportions of the respective parts can be varied without departing from the spirit and scope of the following claims.

Having thus described my invention, I claim:

1. In combination, a valve assembly and a hollow body member having a cylindrical recess therein, said recess being connected to a fluid supply, said valve assembly comprising a valve seat member carrying a substantially ring shaped valve seat located in said recess, the central portion of said seat member being closed to fluid flow, said seat having a longitudinally extending concentrically arranged passage for said fluid, a valve coacting with said valve seat to close said passage, said valve being substantially ring shaped and being spaced away from the walls of said recess, said valve being reciprocable toward and from said seat whereby fluid may pass through and around said valve when the valve is lifted from its seat,

and a valve guide element having a substantially central axially extending passage therethrough, and said valve guide element having a polygonal cross section with substantially flat longitudinally extending side walls forming corners which fit substantially against the inside surface of said recess, said longitudinally extending side walls of said guide element having portions intermediate said corners which are spaced away from said inside surface of said recess whereby fluid passing through the valve seat may flow concurrently through said substantially central passage and around the flat longitudinally extending side walls of said guide element.

2. In combination, a valve assembly and a hollow body member having a cylindrical recess therein, said valve assembly comprising a valve seat element shaped to conform to the shape of said recess, said seat element having an annular valve seat thereon, said seat having an opening through which the fluid flows, a valve ring movable longitudinally toward and away from said seat to close and open said opening, said valve ring being of less diameter than said chamber recess whereby an opening is provided between the valve ring and the chamber as well as through the center of the ring, and a valve guide element in said recess, said guide element having a polygonal cross section with substantially flat side walls forming corners which fit against the inside surface of said curved bore recess, and corner legs at one end of said guide element embracing said valve seat, said guide element having an internal shoulder comprising a stop for said valve ring, and also having a substantially central axially arranged passage extending from said shoulder through its other end, whereby fluid from said seat may flow concurrently through said substantially central passage and around said side walls.

3. The combination defined in claim 2, wherein the guide element has another shoulder of smaller size than said stop shoulder, and wherein a resilient member is provided having one end against said other shoulder and its other end against said valve ring continuously urging said valve ring toward said seat.

4. The combination defined in claim 1, wherein the chamber port recess has a round cross section and the valve guide element has a rectangular cross section.

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