Dec. 1, 1931. G. F. WOELFEL 1,834,080

SLIDE VALVE CONSTRUCTION

Original Filed Jan. 10, 1929

Fig. 1.

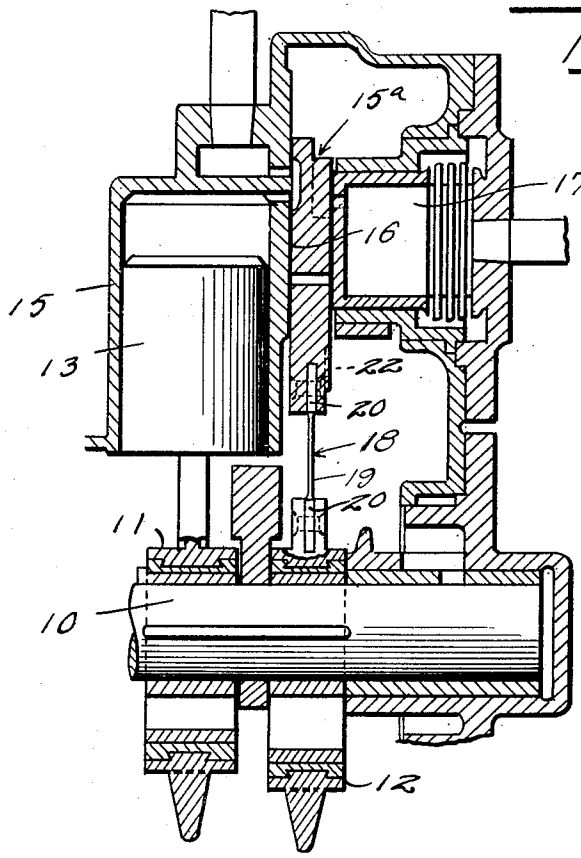


Fig. 3.

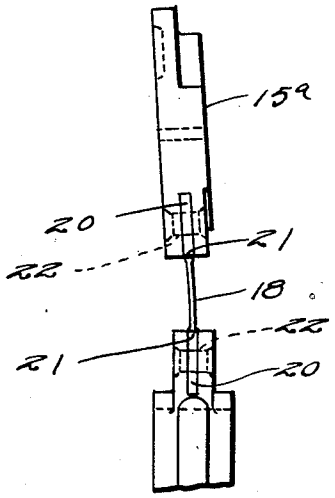


Fig. 2.

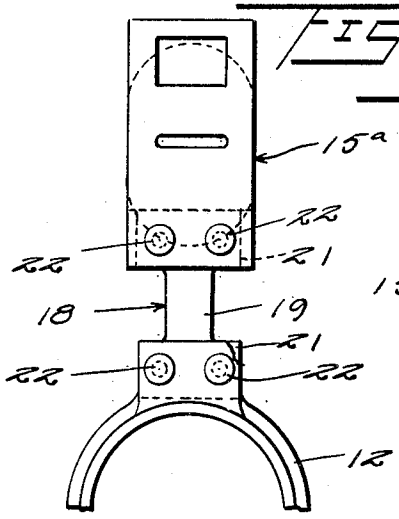


Fig. 4.

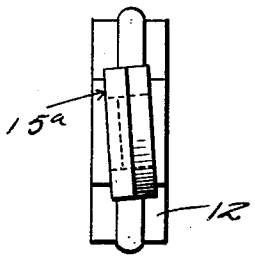
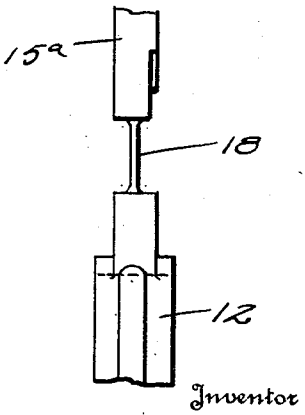


Fig. 5.



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UNITED STATES PATENT OFFICE

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SLIDE VALVE CONSTRUCTION

Application filed January 10, 1929, Serial No. 331,676. Renewed February 20, 1931.

This invention relates to slide valve constructions, and more particularly to the construction of a slide valve for use in small units, such as the compressor units of refrigerating apparatus.

Slide valve seats are extremely difficult to construct in such manner that they will correctly align with an operating shaft in both planes. If the seat is not exactly perpendicular to the longitudinal axis of the shaft and at exactly right angles to this axis, considerable difficulty is noted in getting the valve to seat properly. This difficulty is much more pronounced in small structures of the character just described, for the reason that the use of universal connections is prohibited by lack of space. Even were use of such elements possible, they would be entirely impractical in a slide valve employed in the compressor of refrigerating apparatus of the household type, for the reason that the parts employed would necessarily be extremely small and, as such, unable to withstand the pressures to which they are subjected without undue wear which would rapidily reduce the unit to a noisesome and, therefore, wholly undesirable state.

Furthermore, the cost involved in such constructions is excessive and an important factor in the cost of the complete unit. Therefore, an important object of this invention is to provide a structure eliminating the disadvantages of the usual universal joint while maintaining its advantages and permitting the valve to accommodate itself to the seat.

A further and more specific object of the invention is to provide a structure such that the valve element proper is rigid to its pitman both longitudinally and in the general plane of oscillation of the pitman but may partake of angular movements with relation to such plane and may be rotatably displaced from said plane under the influence of torsional strain.

These and other objects I attain by the construction shown in the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

Figure 1 is a vertical sectional view through a compressor showing a slide valve constructed in accordance with my invention;

Figure 2 is a front elevation of the valve;

Figures 3 and 4 are views giving exaggerated examples of the displacements of the valve which may occur with relation to the pitman proper;

Figure 5 is a side elevation of a slightly modified construction of the valve wherein the flexibility is obtained simply by reduction of the material of the valve stem.

Referring now more particularly to the drawings wherein for the purpose of illustration I have shown a slide valve mechanism generally identical with that disclosed in my prior application for patent on refrigerating apparatus, filed March 1, 1928, Serial No. 258,279, the numeral 10 generally designates a drive shaft and 11 and 12 eccentric operating elements actuating respectively a compressor piston 13 operating in the cylinder 15 and a slide valve 15ª controlling the intake and exhaust of this cylinder. The valve 15ª is disclosed as urged against its seat 16 by a flexible element 17 bearing against the outer face of the valve and subject to the pressure of the exhaust, so that the pressure exerted to seat the valve against its seat 16 is that of the stored pressure.

In accordance with the present invention, the connection between the eccentric element 12 and the valve 15 comprises a reduced element 18, which is of sufficient width to render the same rigid to pressures transverse to the shaft 10 and to resistance to longitudinal movement, while permitting the valve to rotate upon its longitudinal axis or to be angularly displaced from a transverse plane perpendicular to the shaft. These displacements are separately indicated in Figures 3 and 4 but it will, of course, be understood that the actual displacement might very readily be a compound of the displacements indicated. The reduced portion 18 may comprise either an integral connection between the eccentrically operated element and the valve or may comprise a spring strip 19 connecting these elements.

In the latter case, the spring strip is preferably enlarged at its ends both in thickness and breadth, as indicated at 20 and 21 respectively, and is secured to the eccentrically operated element and to the valve by any suitable means, such as rivets, indicated at 22.

A construction of this character permits the valve to seat immediately upon installation, eliminating the expense of "running in" each individual unit and, at the same time, providing a structure which is free from connections which, becoming worn in the course of operation, will cause noises, detracting from the value of the product.

It will be obvious that a construction of this character may be conveniently employed in practically any location where the available space is of such size that a sufficiently strong universal connection cannot be employed.

Since the construction hereinbefore set forth is capable of a certain range of change and modification without materially departing from the spirit of the invention, I do not limit myself to such specific structure except as hereinafter claimed.

I claim:—

1. In a pump, in combination, a slide valve and seat therefor, means yieldingly holding the valve against its seat, and means for operating said value including a flexible pitman whereby to permit the valve to turn about its longitudinal axis and move laterally so as to compensate for any wear therein and in its seat.

2. In a pump, in combination, a slide valve and seat therefor, the slide valve being provided in one end thereof with a recess, means yieldingly holding the valve against its seat, an eccentric element provided with a recess, and a flexible pitman having its ends enlarged in both thickness and breadth and arranged and secured in the recesses of the valve and eccentric element, the flexibility of the pitman permitting the valve to turn about its longitudinal axis and move laterally so as to compensate for any wear therein and in its seat.

In testimony whereof I hereunto affix my signature.

GEORGE F. WOELFEL.