

United States Patent [19]

Bauer et al.

[11] 3,858,605
[45] Jan. 7, 1975

[54] LAMELLAR VALVE

[75] Inventors: **Friedrich Bauer; Karl Berger; Hans Hrabal**, all of Vienna, Austria

[73] Assignee: **Hoerbiger Ventilwerke**, Vienna, Austria

[22] Filed: **Dec. 12, 1973**

[21] Appl. No.: **423,898**

[30] Foreign Application Priority Data

Dec. 22, 1972 Austria 10972/72

[52] U.S. Cl. 137/512.15

[51] Int. Cl. F16k 15/16

[58] Field of Search 137/512.15, 512.4

[56] References Cited

UNITED STATES PATENTS

2,798,505 7/1957 Kehler 137/512.15 X
3,823,735 7/1974 Frenkel 137/512.15

FOREIGN PATENTS OR APPLICATIONS

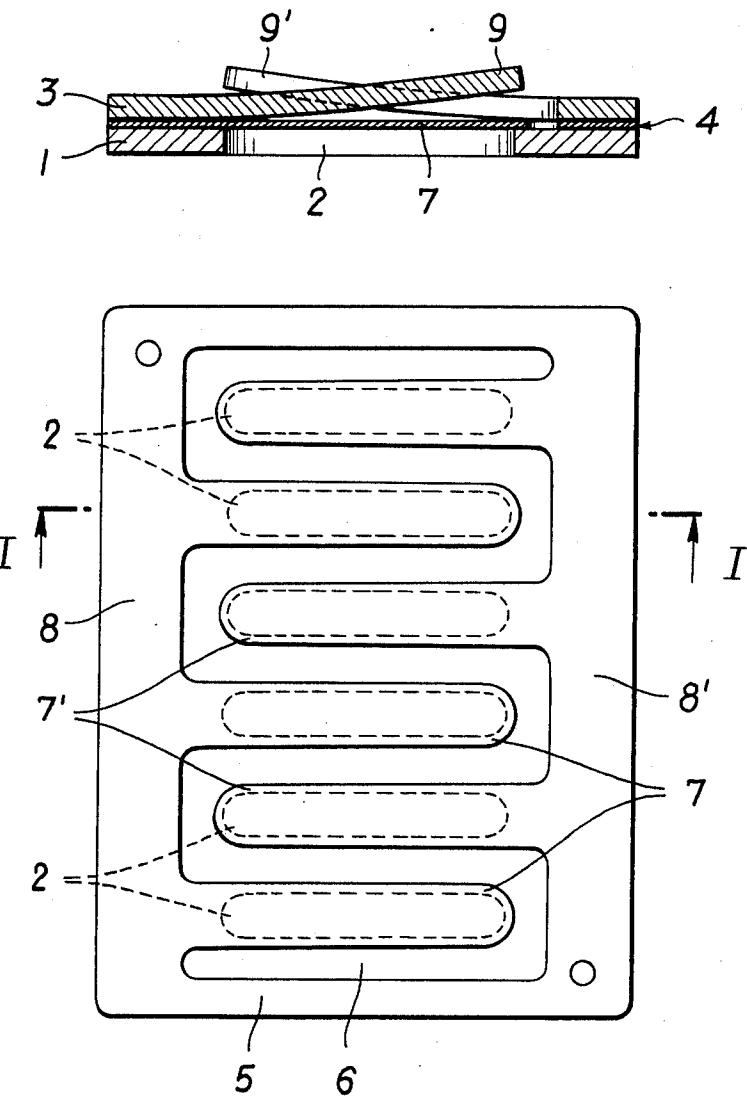
823,184 11/1959 Great Britain 137/512.15

Primary Examiner—Robert G. Nilson
Attorney, Agent, or Firm—Watson, Cole, Grindle and Watson

[57] ABSTRACT

A lamellar valve, such as for compressors, having a seating plate and a plurality of elastic tongues arranged in parallel alongside one another and covering throughflow openings in the seating plate. The free ends of the tongues extend alternately in opposite directions over the throughflow openings. A catcher plate having abutment tongues also extending alternately from opposite directions and bent away from the seating plate forms the end abutment for the free ends of the elastic tongues.

4 Claims, 4 Drawing Figures



PATENTED JAN 7 1975

3,858,605

FIG. 1

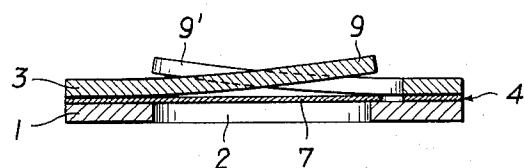


FIG. 2

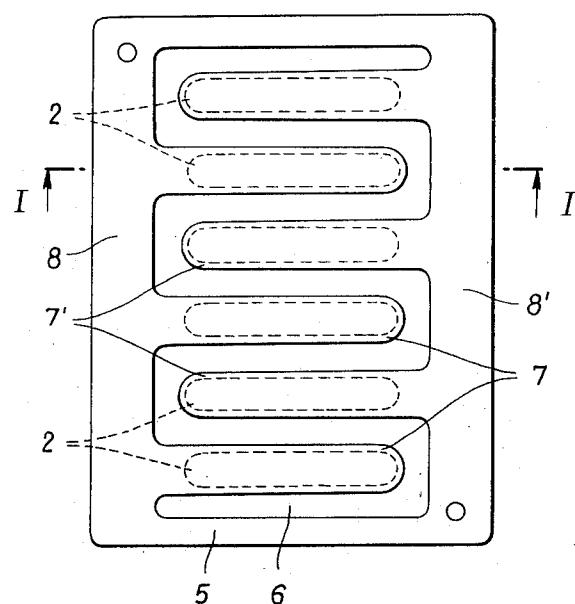


FIG. 3

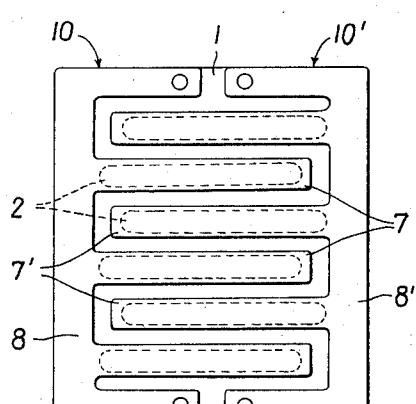
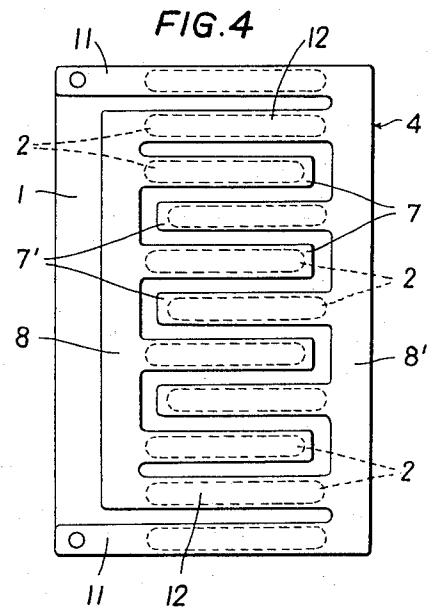


FIG. 4



LAMELLAR VALVE

The invention relates to a lamellar valve, in particular for compressors, having a seating plate the throughflow openings of which are covered by several elastic tongues arranged in parallel alongside one another.

Lamellar valves conventionally consist of elastic tongues which are fixedly clamped at one end to the seating plate and project with their free ends over the throughflow openings of the seating plate which they cover. As well as lamellar valves consisting of separate tongues, there are also known embodiments in which several tongues are joined together at their fixedly clamped ends by a transverse joining web. The lamellar valves are comparatively simple and have a long service life, in particular because of the independent movability of the individual tongues which work substantially elastically, so that hard impacts are avoided. With the valve opened however the stroke gap defined by the tongues decreases from the free end of the tongues to the clamping place. This difference in stroke leads to different flow conditions along the tongues with the result that, in particular in the vicinity of the clamping place of the tongues, impurities are deposited because of the slight flow prevailing there, and these can cause the valve to leak. In addition, with several tongues joined together to form a common closure plate, the tongues are laterally spaced apart by a relatively short distance, with the result that finishing work on the tongues is made difficult, in particular the removal of burrs in the case of punched embodiments.

The invention aims at an improvement of the conventional lamellar valves, in particular with reference to the distribution of the flow over the valve opening area and in relation to the manufacture of the lamellar.

According to the invention there is provided a lamellar valve having a seating plate the throughflow openings of which are covered by a plurality of elastic tongues arranged in parallel alongside one another, wherein the free ends of adjacent elastic tongues project alternately in opposite directions over the throughflow openings of the seating plate in a meshing arrangement.

The clamping places of the tongues in this arrangement rest alternately on different sides of the valve and the sum of the stroke gap areas of two adjacent tongues is always constant over the entire tongue length. As a result an improved distribution of the flow over the valve cross-section is achieved and the tongues can be placed closer to one another so that the available valve opening area is better utilised. Nevertheless the tongues can be simply manufactured, worked and assembled.

According to a preferred embodiment of the invention the elastic tongues projecting in the same direction are connected at one end by a transverse joining web to form two tongue plates each fixed to the seating plates by oppositely directed tongues. The two tongue plates in this arrangement can have the same form and are simple to manufacture, because their tongues have great lateral spacing from one another.

According to another variation of the invention all tongues are formed by a single closure plate which has a closed frame and a meander-shaped cut-out forming the tongues. In this case there is a single closure plate only, with which however the same functional advan-

tages are achieved as with the use of individual tongues or two tongue plates.

In a further development of the invention, a catcher plate forming an end abutment for the free ends of the tongues may be provided, the catcher plate having abutment tongues extending alternately from opposite sides, the free ends of the abutment tongues being bent away from the seating plate. This catcher plate also is comparatively simple to manufacture. It can be punched using the same tools as are used for the closure plate, on which it is merely necessary to bend up the abutment tongues. The catcher plate can also be of divided construction, its two parts having the same shape.

15 In the drawing examples of embodiment of the lamellar valve according to the invention are shown. The drawings show:

FIG. 1 a section in the axial direction through a lamellar valve taken along the line I—I in FIG. 2;

20 FIG. 2 a top plan view of the valve with the catcher plate removed, and

FIGS. 3 and 4 variations of the closure plate.

The lamellar valve according to FIGS. 1 and 2 has a seating plate 1 with throughflow openings 2 and a catcher plate 3. Between these and the seating plate 1 a closure plate 4 is clamped, which according to FIG. 2 comprises a closed frame 5 having a meander-shaped cut-out 6. As a result of the cut-out 6 elastic tongues 7 and 7' are formed, which project alternately in opposite directions from opposite sides of the frame 5 towards each other, all the tongues 7 or 7' projecting in the same direction being joined by joining webs 8 or 8', as the case may be, formed by the side parts of the frame 5.

The tongues 7 and 7' of the closure plate 4 cover the throughflow openings 2 in the seating plate 1, projecting over the said plate alternately in opposite directions, as can be seen from FIG. 2. On opening of the valve the tongues 7 and 7' lift up from the seating plate 1 and rest against the catcher plate 3 which in the embodiment according to FIG. 1 is provided with abutment tongues 9 and 9' which are located above the tongues 7 and 7' of the closure plate 4 and the free ends of which are bent upwards from the seating plate 1. On the basis of the tongues 7 and 7' of the closure plate 4 projecting alternately in opposite directions over the throughflow openings 2, and as a result of the correspondingly arranged abutment tongues 9 and 9', when the valve is open the stroke of a tongue 7 measured in one direction over the length of the tongue alters in inverse proportion to the stroke of the adjacent tongue 7', so that the sum of the total stroke gap areas between two tongues 7 and 7' over the entire length of the tongues is approximately constant. As a result the flow is substantially uniformly distributed over the surface of the valve. The throughflow area of the valve can be better utilized and moreover by avoiding places with little flow, the formation of deposits in the zone of the sealing surfaces of the tongues is avoided.

55 60 FIG. 3 shows a variation of the closure plate 4 which in that illustration is of two-part construction. The tongues 7 and 7' projecting respectively in the same direction are connected together by a joining web 8 or 8' as the case may be to form a tongue plate 10 or 10'. The two identical tongue plates 10 and 10' are arranged one inside the other with tongues 7 and 7' projecting towards one another, so that when combined

they form a closure plate. The tongue plates 10 and 10' are simple to manufacture, and a particular advantage is that the tongues 7 and 7' are spaced at a considerable distance from one another so that the finishing work, in particular the removing of burrs from the edges, is considerably facilitated.

The embodiment of FIG. 4 shows a closure plate 4 having flexible guide rods 11 for guiding the closure plate without friction during the stroke movement. Also in this embodiment the closure plate 4 has tongues 7 and 7' lying adjacent to one another and projecting in opposite directions, the said tongues in each case being connected together by a joining web 8 and 8'. The flexible guide rods 11 connect laterally to the joining web 8. As is shown in this embodiment, through-flow openings 2 of the seating plate are covered by the tongues 7 and 7' and the flexible guide rods 11, and also longitudinal webs 12 provided laterally of the said tongues.

We claim:

1. A lamellar valve having a seating plate the throughflow openings of which are covered by a plural-

ity of elastic tongues arranged in parallel alongside one another, wherein the free ends of adjacent elastic tongues project alternately in opposite directions over the throughflow openings of the seating plate in a meshing arrangement.

10 2. A lamellar valve as claimed in claim 1, wherein the elastic tongues projecting in the same direction are connected at one end by a transverse joining web to form two tongue plates each fixed to the seating plate by oppositely directed tongues.

15 3. A lamellar valve as claimed in claim 1, wherein the tongues are formed by a common closure plate which has a closed frame having a meander-shaped cut-out forming the tongues.

20 4. A lamellar valve as claimed in claim 1 further having a catcher plate forming an end abutment for the free ends of the tongues, the catcher plate having abutment tongues extending alternately from opposite directions, the free ends of the abutment tongues being bent away from the seating plate.

* * * * *

25

30

35

40

45

50

55

60

65