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M. F. GUTERMUTH

AUTOMATICALLY ACTING SPRING FLAP VALVE

Filed Jan. 17, 1923

Fig. 1.

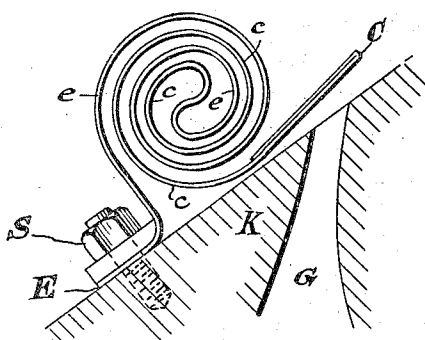


Fig. 2.

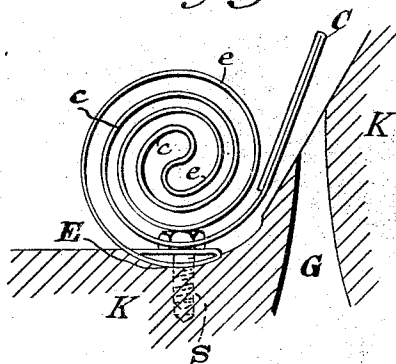


Fig. 3.

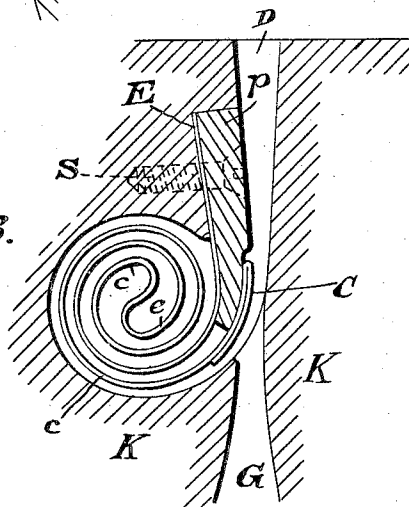
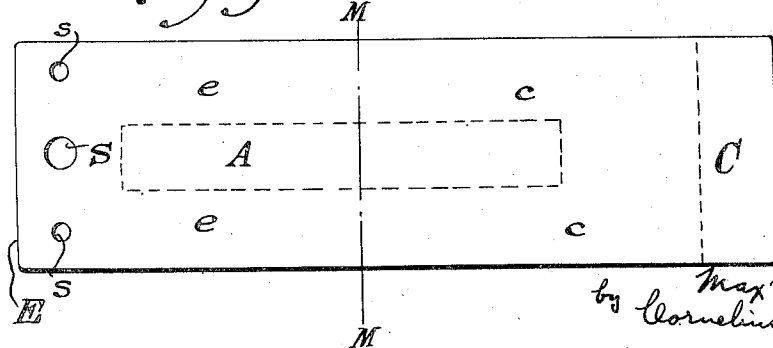


Fig. 4.



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AUTOMATICALLY-ACTING SPRING FLAP VALVE.

Application filed January 17, 1923, Serial No. 613,153, and in Germany February 21, 1922.

In accordance with my invention, a double spiral spring has a part suitably secured with respect to the structure forming the valve port and another part arranged for movement toward and away with the port.

Further in accordance with my invention, an integral part of a spring, as aforesaid, is arranged to co-operate with a valve port.

My invention resides in apparatus of the character hereinafter described and claimed.

For an illustration of some of the various forms my apparatus may take, reference is to be had to the accompanying drawing in which:

Fig. 1 is a sectional view of the valve with a flat seat.

Fig. 2 is a view similar to Fig. 1 showing a modification.

Fig. 3 is a sectional view of a flap valve having a curved seat combined with a diffuser.

Fig. 4 is a plane view of the valve sheet before it is coiled into the double spiral form.

Referring to Fig. 1 my improved valve is shown as a double spiral coiled out of a sheet of steel or bronze or other elastic material. Preferably both ends of the sheet are left plane, one end C serving as a seat plate to close the port G in the seat body and the other end E being fastened to the seat body by a screw S. In Fig. 3 the end E of the coil is clamped between the seat body K and the plate P by means of screw S. To diminish the lift of the valve, a diffuser-like channel D is arranged in the seat body above or beyond the port G of the seat. Fig. 4 shows the plane sheet of steel or bronze or other elastic material before being coiled. The line MM shows where the coiling should begin in order to produce the double spiral. When valves are mounted as shown in Figs. 1 and 3, where the fastening screws S are outside the spirals, the coils may be rolled from an entire sheet as shown in Fig. 4, but where the fastening screw is positioned radially of the coil as in Fig. 2, for it to be accessible it is necessary that the sheet be slotted as shown in dotted lines at A, Fig. 4. If desired, pins s may be provided to prevent the rotative movement of the valve with respect to the single screw S. If the flap is unusually broad, it may be desirable to utilize two or more screws instead of the pins.

The practical importance of this new invention, in which the spring part of the valve

is formed as double spiral, consists in the following:

The complicated and costly manner of cutting and rolling the substantially U-shaped valve sheet of prior art valves without spindles is obviated for, as shown, the double spiral is rolled from a simple rectangular sheet. It is true that older forms of flap valves were made from a simple plane sheet, but for mounting such devices it was necessary to provide a spindle, and this is not necessary with the present invention where the sheet in its entire breadth is utilized as a supporting arrangement for the seat plate. Thus the stability of the valve is considerably increased and the thickness of the valve sheet can be smaller.

Taking all distinctive features together, the new flap valve combines the advantages of prior constructions of the type referred to while avoiding their drawbacks.

I declare that what I claim is:—

1. The combination with fluid flow controlling structure having a converging-diverging port, of a valve adapted to close said port in its region of minimum area, and spring means supporting said valve and permitting oscillatory movement thereof.

2. The combination with fluid flow controlling structure having a converging-diverging port and a recess opening into said port, of a valve adapted to close said port, and spring means contained in said recess supporting said valve and permitting oscillatory movement thereof.

3. The combination with fluid flow controlling structure having a converging-diverging port, and a recess opening into said port, of means contained in said recess controlling the passage of fluid through said port, said means comprising a double spiral spring formed from a rectangular sheet having an integral freely oscillatory end portion adapted to close said port, and means for securing the other end portion of said spring to said structure.

4. Fluid flow controlling structure comprising a converging-diverging port with a recess opening thereinto, a seat plate comprising one wall of said port, and a double spiral spring in said recess having an integral freely oscillatory end portion closing said port at times and at other times resting on said seat plate.

5. In a structure for controlling the flow of fluid, a seat body having a port and a

diffusor-like channel beyond said port, a plate forming one wall of said channel, a flap valve made of a sheet of elastic material comprising a spring part and a seat part, 5 said sheet being rolled in such a manner that its spring part forms a double spiral of which the innermost coil begins in, or near the middle of the said sheet, one end of said sheet being jammed in between the seat body and 10 said plate, said valve hanging free and mov-

able for its automatic play substantially as described.

6. The combination with fluid flow controlling structure having a port, of a flap valve controlling passing of fluid through said 15 port, and means comprising a double reverse spiral spring formed from a rectangular sheet supporting said valve and permitting oscillatory movement thereof.

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