No. 680,245. Patented Aug. 13, 1901.

M. F. GUTERMUTH.

VALVE.

(Application filed Jan. 23, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

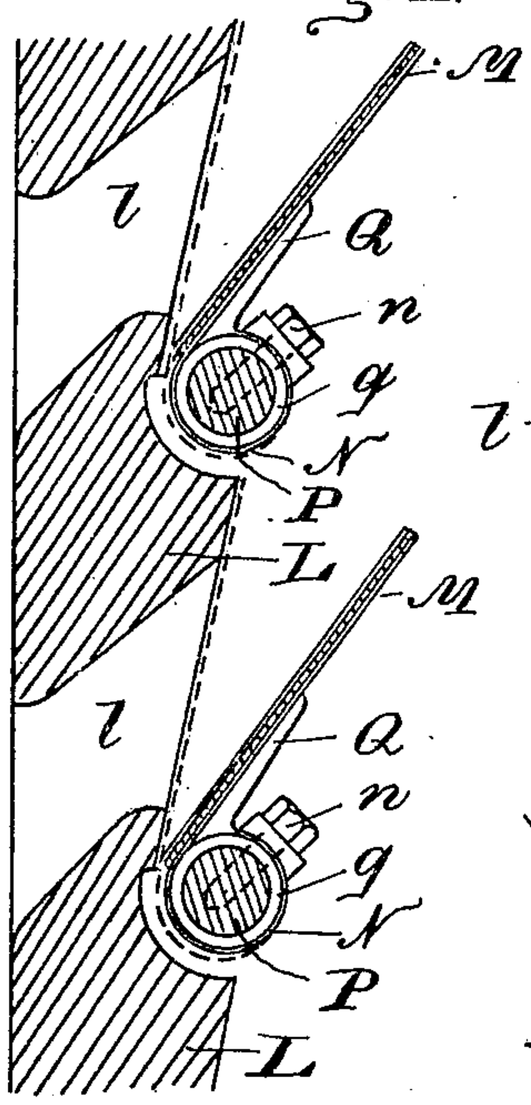


Fig. 2.

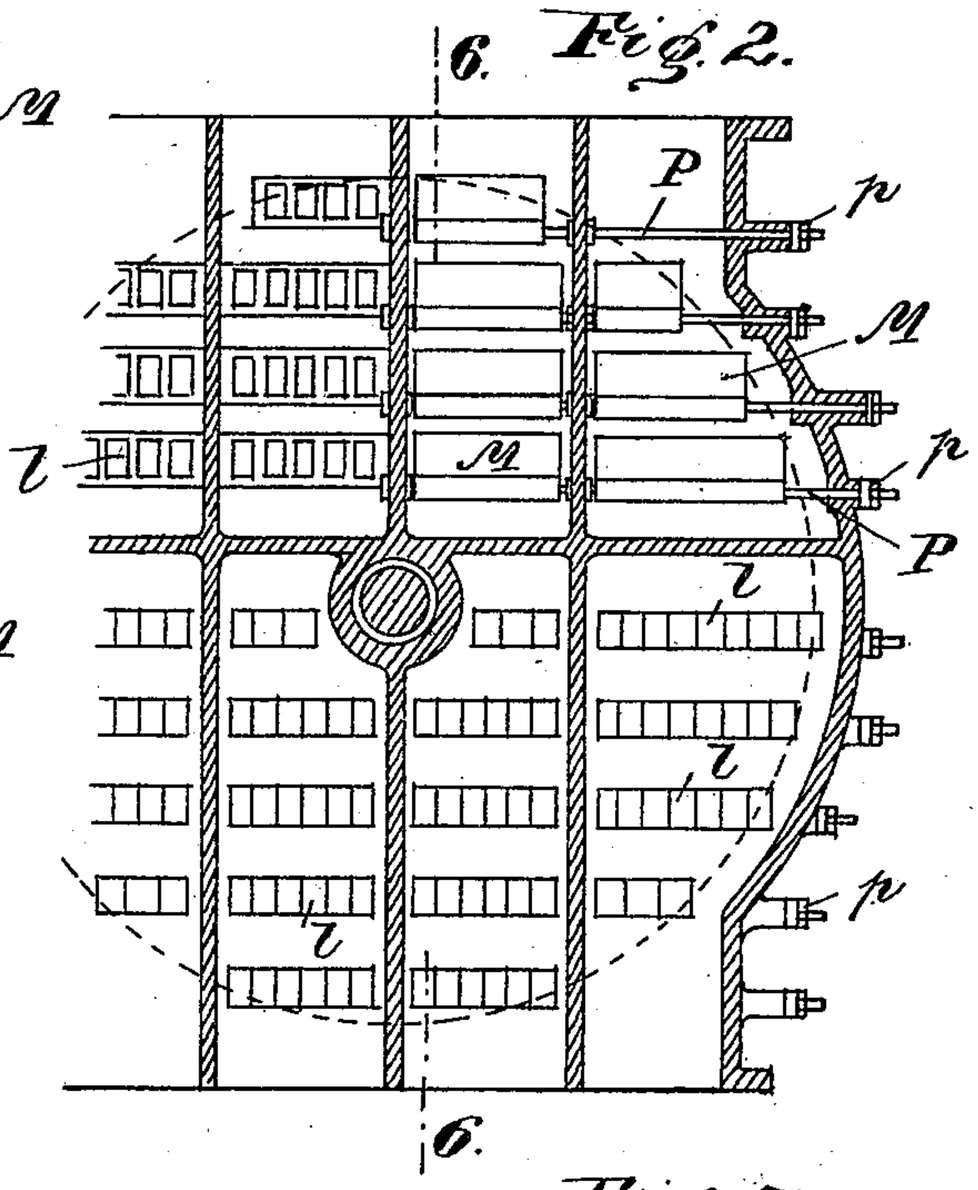


Fig. 3.

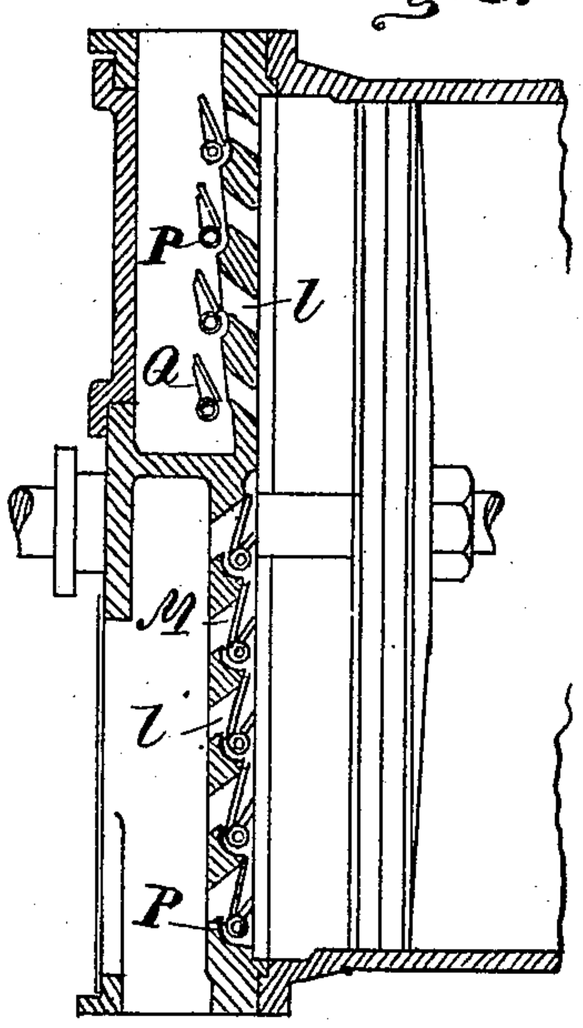
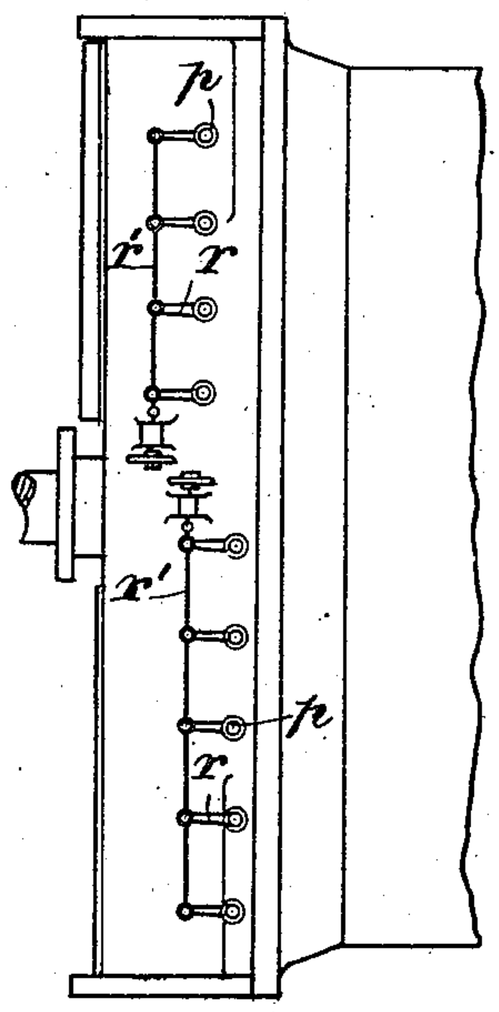


Fig. 4.



Witnesses:
C. Holloway
W. C. Pinckney

Inventor:
Max Friedrich Gutermuth,
By F. Lloyd Thomas
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 680,245. Patented Aug. 13, 1901.

M. F. GUTERMUTH.

VALVE.

(Application filed Jan. 23, 1900.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 5.

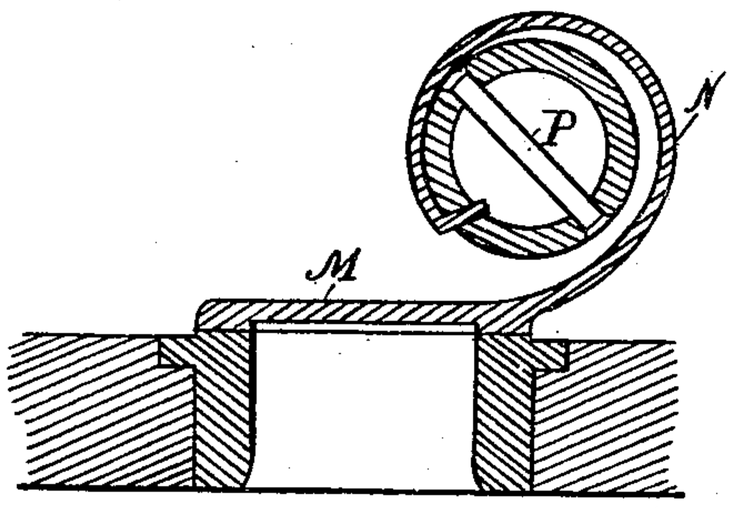
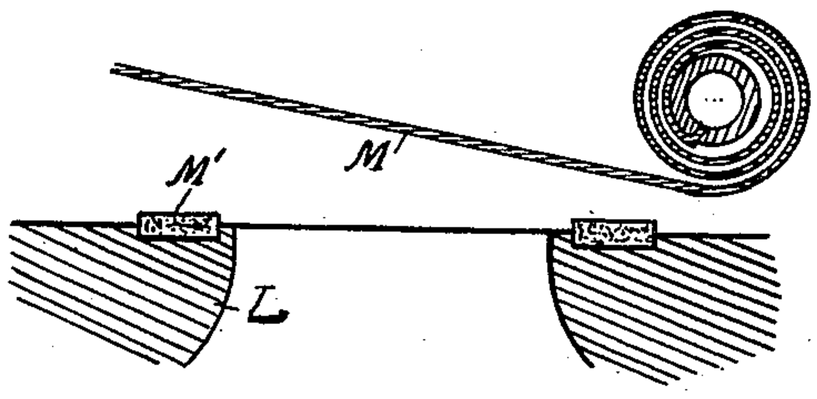


Fig. 6.



Witnesses
A. H. Maiden.
David W. Gould.

Inventor
Max Friedrich Gutermuth,
by Edmond Cougar Brown
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MAX FRIEDRICH GUTERMUTH, OF DARMSTADT, GERMANY.

VALVE.

SPECIFICATION forming part of Letters Patent No. 680,245, dated August 13, 1901.

Application filed January 23, 1900. Serial No. 2,480. (No model.)

To all whom it may concern:

Be it known that I, MAX FRIEDRICH GUTERMUTH, professor at the Technical High School of Darmstadt, residing at Kiesstrasse 107, Darmstadt, Germany, have invented new and useful Improvements in Valves, (for which I have applied for Letters Patent in Germany, G. 13,293^{I}/59, dated March 24, 1899, and G. 13,809^{I}/59, dated September 14, 1899, additional application, in England, No. 25,566, dated December 27, 1899,) of which the following is a specification.

The present invention relates to improvements in spring flap-valves having for their object to effect a quick working of the same without the drawbacks which are experienced in the valves hitherto employed. These drawbacks consist mainly in the fact that a flap-valve does not close as fast as necessary in quick-working apparatus.

The object of this invention is therefore more particularly to obviate the occurrence of shocks in the working of the valves. In general, the improved arrangement of the spring of such valves is such that the spring is connected at one end adjustably to the valve-casing and is fastened at its other end to the body of the valve, so that it can act both as a compression-spring and as a tension-spring. This spring is regulated by the adjustment of its abutment against the valve-casing in such a manner that in the position of the spring wherein no strain is exercised on it the body of the valve would be slightly raised from the valve-seat. The consequence of this is that the spring during the last portion of the closing stroke of the valve acts with a retarding effect upon the valve-body—that is to say, diminishes the shock—while inversely at the opening of the valve this action of the spring produces at first a corresponding acceleration. A similar retardation of the movement is produced toward the end of the opening movement, and an acceleration takes place at the commencement of the closing movement of the valve. In cases in which the weight of the valve-body is very small the retarding action may sometimes be omitted in the closing of the valve, especially when the pressure of the liquid or gas acting to close the valve is very slight.

On the accompanying drawings, Figure 1 is a section through a combination of several flap-valves. Fig. 2 is a plan of a cylinder-cover having rows of flap-valves, the flaps being partly omitted. Fig. 3 is a section through Fig. 2 on the line 6 6. Fig. 4 is a side elevation of the adjusting device for the flap-valves. Fig. 5 is an elevation of a special arrangement of spring. Fig. 6 is a sectional view of a modified construction, the valve being open.

The same letters indicate corresponding parts in the several figures.

Fig. 1 shows a flap-valve in which L is the valve-seat; M, the closing part or flap; N, the spring, and P the axle or spindle, upon which one end of the spring N is fixed. Q is the abutment against which the flap bears when it is opened to its greatest extent. The flap M consists of a piece of sheet-steel and is formed in one piece with the spring N. This spring bears when the flap is opened closely around the boss *q* of the abutment, which is fixed on the spindle P. A simple clamping-screw *n* serves for the attachment of the end of the spring. The adjustment of the flap is effected by rotating the axle P preferably in such a manner that when the spring N is not under strain the flap will be slightly open. The turning and the fixing of the axis P may be effected in any known manner. The figure also shows the manner in which several flaps are to be arranged and how the passages *l* are arranged obliquely in order to cause the flow to take place as much as possible in the direction of the open flap.

Figs. 2, 3, and 4 show the general arrangement of flaps in the manner in which they may be situated on the cover of the cylinder of a compressor or of a blower. The entire cylinder-cover is pierced by apertures *l*, which serve on the one side as the inlet and on the other side as the outlet. These apertures *l* are arranged in rows, and for each row there is a number of closing-flaps M, each row of which is mounted on a common axis P. These axes pass out through suitable stuffing-boxes *p* and are provided externally with levers *r*. These levers may be connected together by means of connecting-rods *r'*, so that they can be operated at the same time and by the same operation.

Fig. 5 shows a special form of the spring-

flap. In this case also the flap M and the spring N are made in one piece, and the spring N is fixed on the adjustable axle P. The flap itself is in this case made very strong and is ground on its meeting surfaces, while the spring portion is rolled thinner.

Fig. 6 shows a flap M, which is of particularly light construction, and in which a particular elasticity is produced by means of several coils of the spring N. In order to make the flap lighter, the packing-ring M′ in this case is also rigidly fixed to the valve-seat L.

I claim—

1. A spring flap-valve consisting of the valve-plate and a bent spring extending from the valve-plate, integral therewith, and supporting the same, substantially as described.

2. A spring flap-valve consisting of the valve-plate and a spring part integral therewith, coiled helically, and supporting the valve-plate, substantially as described.

3. A spring flap-valve consisting of a valve-plate, a spring extending from an edge of said plate, and a rotatable axis to which the other end of the spring is fixed, substantially as described.

4. A spring flap-valve consisting of a valve-plate, a spring integral therewith and bent helically, and a rotatable axis to which the inner end of the helical spring is fixed, substantially as described.

5. The combination of a valve-casing, a spring flap-valve consisting of one piece of rolled sheet metal forming the valve-plate and the bent spring for connecting the plate with the valve-casing, substantially as described.

6. The combination of a number of spring flap-valves, each valve having a valve-plate and a supporting-spring extending from an edge of said plate with one rotatable axis common to said flap-valves and extending outside the valve-case, and means to adjust the position of said axis, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MAX FRIEDRICH GUTERMUTH.

Witnesses:
RICHARD WIRTH,
FRIEDRICH QUEHL.