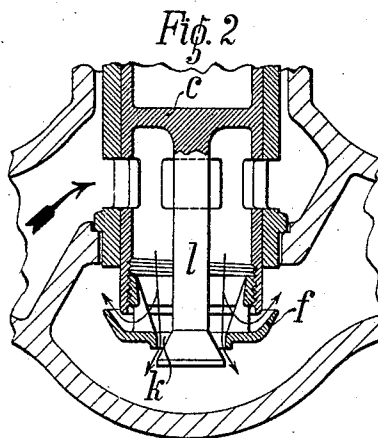
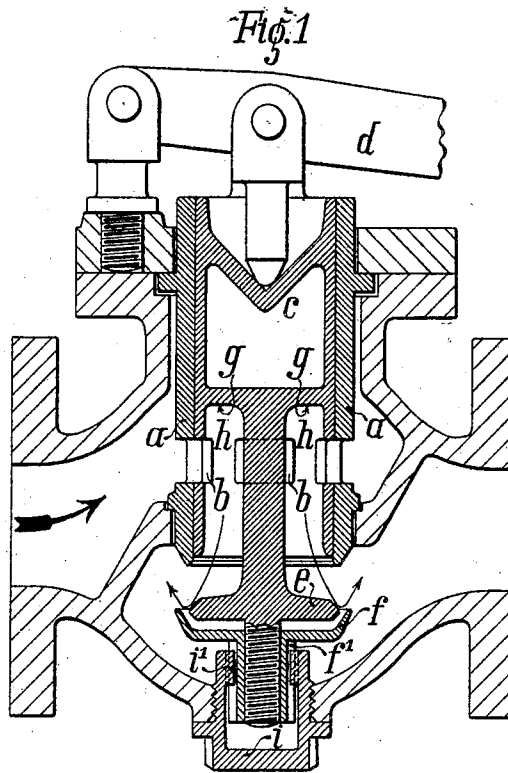


No. 836,258.

PATENTED NOV. 20, 1906.

J. HÜBNER & I. MAYER.  
REDUCING VALVE.

APPLICATION FILED FEB. 19, 1906.



Witnesses.

Frederick Cleveland.  
Samuel Percival

Inventors.

Josef Hübner  
Isidor Mayer  
By Attorneys  
Wheatley Mackenzie

# UNITED STATES PATENT OFFICE.

JOSEF HÜBNER AND ISIDOR MAYER, OF VIENNA, AUSTRIA-HUNGARY.

## REDUCING-VALVE.

No. 836,258.

Specification of Letters Patent.

Patented Nov. 20, 1906.

Application filed February 19, 1906. Serial No. 301,918.

*To all whom it may concern:*

Be it known that we, JOSEF HÜBNER and ISIDOR MAYER, residing at XIX/6 Muthgasse 64, (Staatbahnhof Heiligenstadt,) Vienna, Austria-Hungary, a subject of the Emperor of Austria-Hungary, have invented certain new and useful Improvements in or Connected with Reducing-Valves; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Pressure-reducing valves wherein the passage for the fluid is regulated by a tubular or piston-slide valve have the disadvantage of not being capable of maintaining the adjusted reduced pressure during working. This pressure mostly falls at the moment when consumption begins but in any case when a certain amount of steam has been used and to a greater extent according to the greater consumption. This is due to the fact that the high-pressure steam flowing into the low-pressure steam-chamber with increasing speed, especially when the consumption is great, acts with a correspondingly-increasing closing effect on the regulating-organs through dynamic return thrust, so that the regulating-organs of the valves open an insufficient passage.

The device that forms the subject of the present invention obviates the said disadvantage in pressure-reducing valves furnished with tubular or piston slides. Furnished with this device these valves are capable whatever the extent of the consumption of opening the largest possible passage for the flowing steam—that is, to act precisely as if the steam conveyed to the chamber where it is consumed were to flow in unthrottled through a completely-opened valve out of a steam-boiler the pressure in which was the same as the desired adjusted low pressure.

The essential feature of this device is that the steam flowing into the reduced-pressure chamber is conveyed onto a diverting organ which diverts it or reverses the direction of flow. Hereby a forward thrust is produced which modifies or, if desired, can be arranged to exceed the above-described objectionable pressure of the back thrust.

In the accompanying drawings, Figure 1 is a sectional elevation of a reducing-valve con-

structed according to this invention, and Fig. 2 is a similar view of a slightly-modified form of valve.

The pressure-reducing valve shown in Fig. 1 consists of a box *a*, arranged in the casing and furnished with inlet-openings. In this box a tubular slide *c*, acting as a regulating organ and furnished with openings *b*, which coincide, is fitted steam-tight. This tubular slide *c* is pushed downward in the known manner by a weighted lever *d*, so that the inlet-openings in the box *a* coincide with the openings *b* in the slide *c*. The slide-valve *c* carries the valve *e*, which closes and effects a complete shutting off of steam when in the course of working the quantity of steam taken for consumption falls to zero.

The valve *e* carries the diverting organ *f*, which is dished at the top and is screwed onto a central screw-pin. This device *f* forces the steam flowing against it and spreading out in the form of a funnel to change the direction of its flow, as indicated by the arrows. The action of this device will be at once seen from the drawings.

The steam flowing downward exercises against the upper surface *g* of the medium-pressure cylinder *h* a dynamic back thrust which increases with the increase in the consumption of steam and produces the objectionable closing force described at the outset and throttles the passage. In consequence, however, of the arrangement of the diverting device *f* a novel forward-thrust action which increases with the consumption of steam is caused by the steam flowing out against the device *f* and which action being in the opposite direction compensates the objectionable action of the back thrust previously described and if the diverting device be suitably formed even exceeds it, and therefore is at any time capable of maintaining the necessary opening—that is, up to the fullest extent of the consumption.

In the form of the invention shown in Fig. 2 the diverting organ *f* is screwed into a tubular extension of the tubular slide *c*, on the central pin *l* of which is the cone *k*. This action can be regulated in a desirable manner by introducing a portion only of the steam into the diverting organ, the remainder being allowed to flow away undiverted into the reduced-pressure chamber. By

varying the two parts of the stream flowing in any desired extent of opening can be effected by the diverting device. This regulating of the opening action is effected by placing the diverting device at a suitable height. The higher the diverting organ *f*, Fig. 1, is screwed in the more steam will be conveyed onto it and the greater will be the forward-thrust action. Inversely, the lower the diverting organ *f* is screwed down the more steam will flow away undiverted. On the other hand, in the form of the invention shown in Fig. 2 the lower the diverting organ *f* is screwed down the smaller will be the annular space remaining between the opening *k* and the conical head of the pin *l*, and thereby the portion of undiverted steam, the greater, on the contrary, will be the passage-opening in the diverting organ *f*, and thereby the portion and the forward-thrust action of the undiverted part of the quantity of steam. The reverse takes place of course when the diverting organ is screwed up high, Fig. 2. In all the adjusted positions there remains in every case, as shown in the drawing Fig. 2, the same extent of passage for the total quantity of steam flowing against the diverting organ *f* and the circular space.

Fig. 1 shows, moreover, an arrangement for adjusting the height of the diverting organ *f* from outside. For this purpose the diverting organ is made to slide, but not, however, to turn in the firmly-screwed-in box *i*, by means of the projections *i'*, which extend into the grooves *f'*. By turning the tubular slide *c*, preferably by means of the supporting-bracket of the released lever *d'*, the screwing is effected, and thereby the adjustment to the proper height of the diverting organ *f*, without opening the casing.

The constructional form of the diverting device as well as the nature of the fixing or connecting of the same with the regulating device for the pressure-reducing valve are obviously capable of considerable variation. It will be readily understood that the effect

will be the same whether the apparatus be used for gases or for liquids.

What we claim, and desire to secure by Letters Patent is—

1. In a reducing-valve, the combination with the tubular or piston slide which is adapted to regulate the pressure, of a diverting organ adapted to intercept the pressure medium flowing into the reduced-pressure chamber and partially reverse the direction of flow and thereby produce a forward thrust to counteract the force of the dynamic back thrust of the pressure medium.

2. In a reducing-valve the combination with a slide-valve adapted to regulate the pressure and a stop-valve, of a dished plate or deflector surrounding said stop-valve adapted to change the direction of flow of the outflowing pressure medium.

3. In a reducing-valve the combination with a slide-valve adapted to regulate the pressure and a stop-valve formed integral therewith, of a screw-threaded extension on the valve-spindle, a dished plate or deflector mounted on the said extension and adapted to be adjusted by rotating the valves, and a guide-box arranged to guide the deflector axially but prevent its rotation during adjustment.

4. In a reducing-valve, the combination with a slide-valve adapted to regulate the pressure and a stop-valve, of a dished rim surrounding said stop-valve and so arranged as to divert a portion only of the outflowing pressure medium, and means for adjusting the rim to vary the proportion of the diverted to the undiverted outflowing pressure medium.

In testimony whereof we have affixed our signatures in presence of two witnesses.

JOSEF HÜBNER.  
ISIDOR MAYER.

Witnesses:

ALVESTO S. HOGUE,  
AUGUST FUGGER.