

No. 828,657.

PATENTED AUG. 14, 1906.

J. HÜBNER & I. MAYER.
AUTOMATIC CUT-OFF VALVE.
APPLICATION FILED APR. 22, 1905.

Fig. 1.

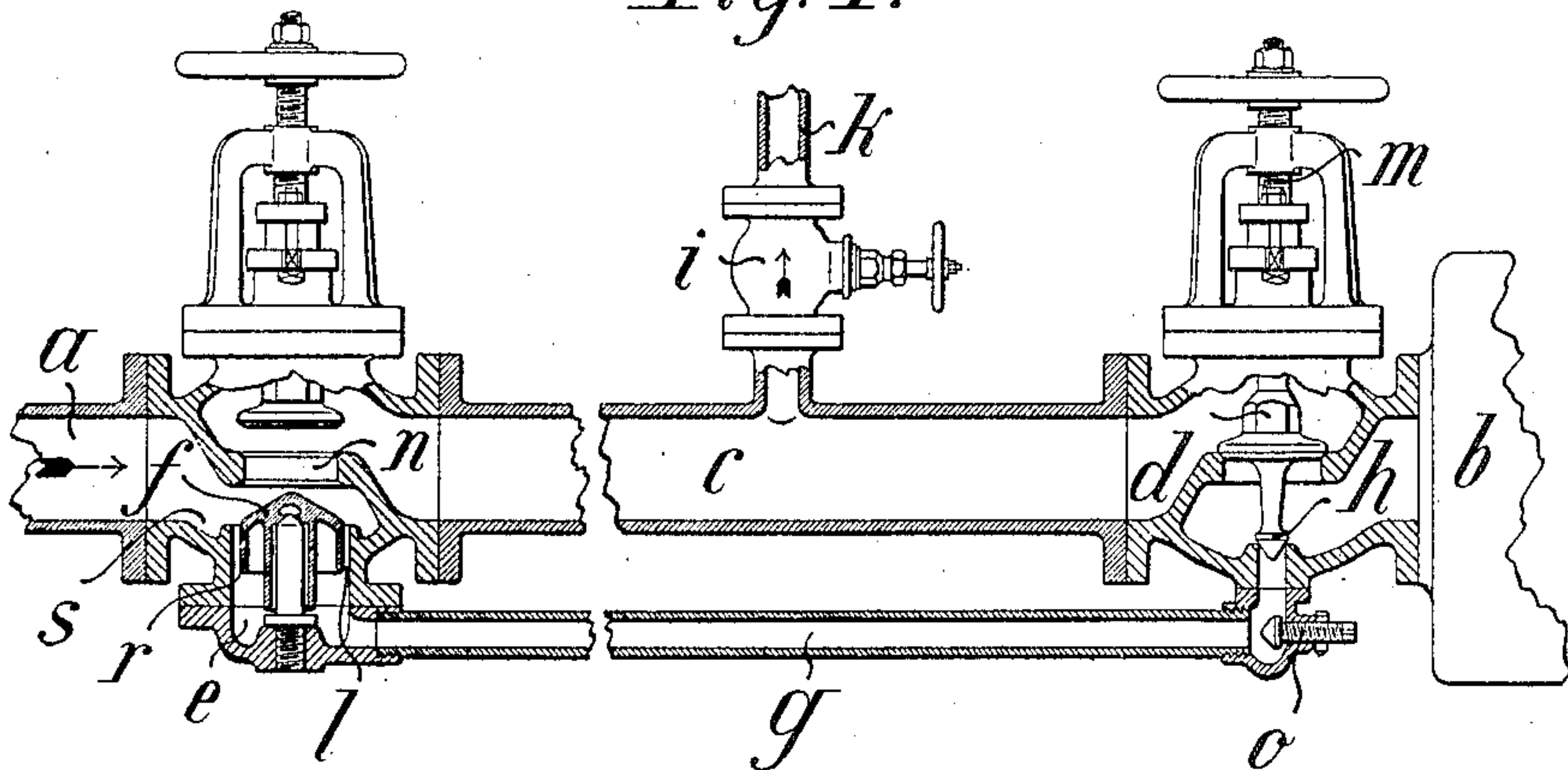
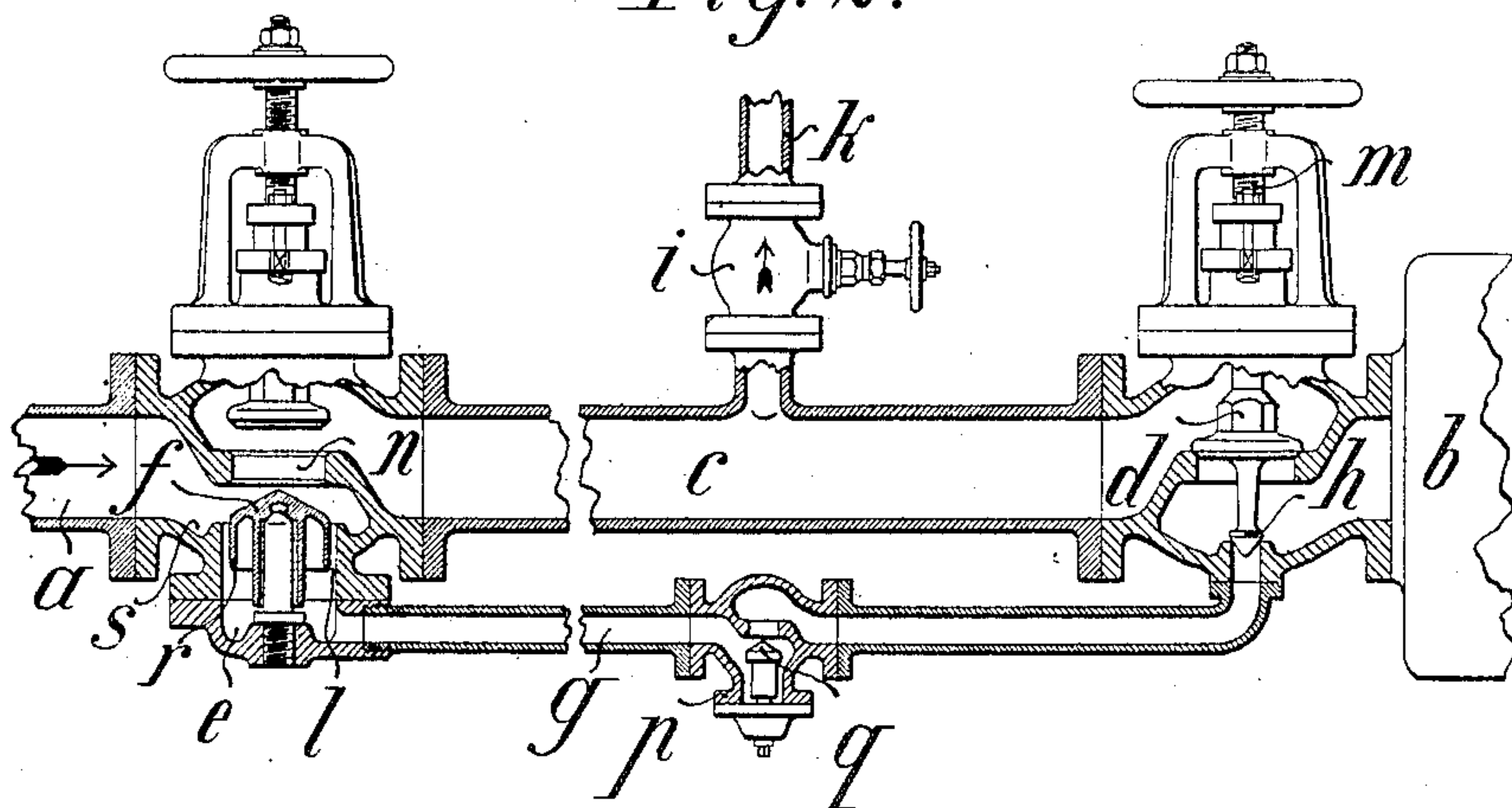


Fig. 2.



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AUTOMATIC CUT-OFF VALVE.

No. 828,657.

Specification of Letters Patent.

Patented Aug. 14, 1906.

Application filed April 22, 1905. Serial No. 256,874.

To all whom it may concern:

Be it known that we, JOSEF HÜBNER and ISIDOR MAYER, subjects of the Emperor of Austria-Hungary, residing at 64 Muthgasse, Vienna, Austria-Hungary, have invented certain new and useful Improvements in Automatic Cut-Off 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.

This invention relates to a device applied to automatic cut-off valves which act to shut off steam in case of pipe fracture, and has for its object to impart to such valves a double capacity hitherto unknown, first, that of closing in the case of an escape of steam entirely independent of the extent to which steam is being properly taken at the time—that is, upon the slightest fracture occurring or the steam-pipe being in any way inadequately packed; second, that of remaining open while steam is being taken to any desired extent and adjustable highest limit and of closing only when this limit is exceeded.

Figure 1 of the accompanying drawings illustrates in sectional elevation an example of such a device, and Fig. 2 a modification of the same.

The steam-pipe *c*, leading to the place of steam consumption *b*, (steam engine, boiler, or the like,) is attached to an automatic cut-off valve of any preferred kind acting in case of pipe fracture. Closely in front of the place of consumption *b* a screw-down valve *d* is introduced in the usual manner. The valve-face of the self-closing body *f* is furnished with a downwardly-directed tubular extension *r* or with disk-shaped ribs. The casing of the emergency-valve or the spindle is so constructed that a shut-off space is created through the self-closing body, which space communicates, by means of an annular opening *l* or a special pipe, with the inlet side of the boiler. By means of an auxiliary pipe *g* this space *e* is connected with the place of consumption. The mouth of the auxiliary pipe is furnished with a valve *h*, which can be advantageously connected with the valve *d*, and consequently opened and closed simultaneously therewith.

In order that it may be possible to test the action of the emergency-valve, a blow-off pipe *k*, provided with a valve *i*, may be attached to the steam-pipe. The steam coming from *a* flows through the emergency-

valve and the steam-pipe *c* until it reaches the closed valve *d* and at the same time through the annular opening *l* into the space *e* and the closed auxiliary pipe *g*. The self-closing body *f* is so adjusted that if there be a slight defect in the main supply-pipe *c* or the valve *i* of the test-pipe *k* be opened the self-closing body *f* will certainly close. The emergency-valve thus adjusted would, however, be too sensitive for proper working. The auxiliary pipe *g* creates a second stage or degree of sensitiveness for the highest extent to which steam is taken independent of the previously-mentioned first stage of sensitiveness. When the valves *d* and *h* are opened, the steam flows through the pipe *c* and also through the auxiliary pipe *g* to the place of consumption. The proportions of the diameter of the annular opening *l*, on the one hand, and the opening of the pipe *g* at the place of consumption and of the valve *h*, on the other hand, are so calculated that with any—that is to say, up to the highest—allowable consumption of steam an approximately equal steam-pressure prevails in the chamber *e* and space *n* above the self-closing body *f*. Thus until the consumption of steam reaches the greatest allowable extent the pressure will exercise no influence on the self-closing valve. If, however, this highest normal quantity of steam be exceeded—for example, in the event of the engine racing or a fracture occurring at the place of consumption *b*—the steam flows more quickly through the wide main pipe *c* than through the narrow auxiliary pipe *g*, as the proportions of the diameter of the annular opening and of the mouth of the auxiliary pipe do not admit of a similar increase of speed in the auxiliary pipe. In consequence of this the pressure in *n* above the valve-body *f* will become less than the pressure in the space *e* below the valve-body *f*, and the valve will be pushed by this excess pressure into its closing position. The highest limit of the normal steam-take can be adjusted as desired by a suitable choice of diameter for the annular opening and of the auxiliary pipe *g*. In Fig. 1, for example, a throttling of the diameter of the auxiliary pipe *g* by means of a regulating-valve *o* is shown.

A modification of the above-described means of regulating the sensitiveness is illustrated in Fig. 2. Into the auxiliary pipe *g* a self-closing valve *p* of a known kind is introduced, the closing-body *q* of which is raised

into the closing position when a certain velocity of speed is reached. Thereby the auxiliary pipe *g* is shut off, the immediate consequence of which is an increase of pressure in the space *e* and an increase of closing power and the closing of the emergency-valve *f*. Accordingly by regulating the sensitiveness of the auxiliary valve *p* by varying the lift or by other suitable known means the sensitiveness of the emergency-valve can be adjusted in the simplest manner for the highest quantities of steam intended to be taken.

It is not necessary that the two valves *h* and *d* should be coupled by means of a spindle common to both. It is quite sufficient if the auxiliary pipe *g* be opened first, and thereupon the valve *d*, or both together. Again, the auxiliary pipe may open directly into the place of consumption and the space *e* shut off from the self-closing body *f* be put in communication with the inlet side or the side of the boiler otherwise than by means of the annular opening *l*.

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

1. The combination of an automatic cut-off valve for steam-pipes as described, a chamber in the valve-casing below the valve partly closed by the valve and communicating with the steam-inlet side of the valve-casing, a screw-down controlling-valve, and a supplementary pipe connected with the chamber and with the screw-down valve and adapted to maintain approximately equal pressure on both sides of the automatic valve while steam is being consumed to the fullest extent allowable but to effect a preponderance of pressure in the inclosed chamber sufficient to close the automatic valve should the pressure limit be exceeded or the steam-pipe become even slightly leaky.

2. The combination of an automatic cut-off valve for steam-pipes as described, a chamber in the valve-casing below the valve

partly closed by the valve and communicating with the steam-inlet side of the valve-casing, a screw-down controlling-valve, and a supplementary pipe connected with the chamber and with the screw-down valve and adapted to maintain approximately equal pressure on both sides of the automatic valve while steam is being consumed to the fullest extent allowable but to effect a preponderance of pressure in the inclosed chamber sufficient to close the automatic valve should the pressure limit be exceeded or the steam-pipe become even slightly leaky, and means for regulating the sensitiveness of the automatic valve, substantially as described.

3. The combination of an automatic cut-off valve for steam-pipes as described, a chamber in the valve-casing below the valve partly closed by the valve and communicating with the steam-inlet side of the valve-casing, a screw-down controlling-valve, and a supplementary pipe connected with the chamber and with the screw-down valve and adapted to maintain approximately equal pressure on both sides of the automatic valve while steam is being consumed to the fullest extent allowable, but to effect a preponderance of pressure in the inclosed chamber sufficient to close the automatic valve should the pressure limit be exceeded or the steam-pipe become even slightly leaky, and means for regulating the sensitiveness of the automatic valve consisting of an adjustable self-closing valve introduced into the supplementary pipe and adjustable in the usual manner as to its sensitiveness, substantially as described.

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

JOSEF HÜBNER.
ISIDOR MAYER.

Witnesses:

ALVESTO S. HOGUE,
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