

No. 730,465.

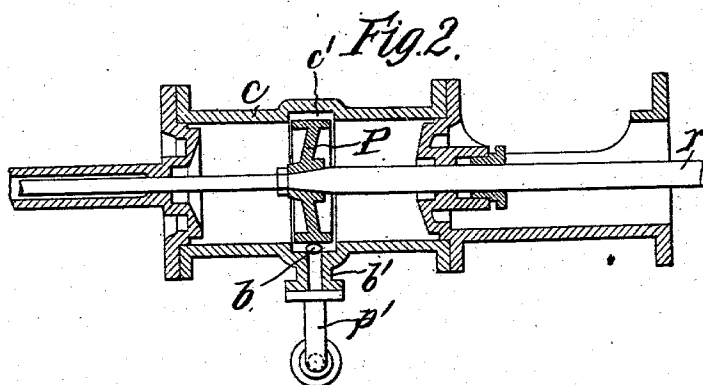
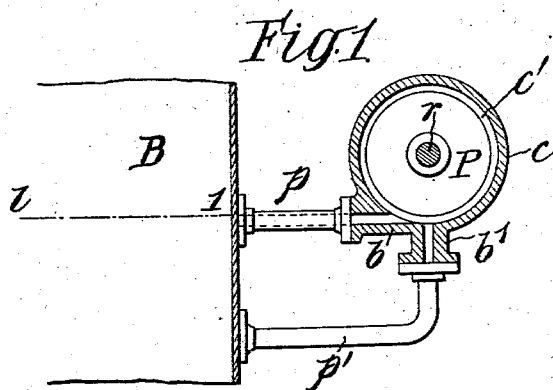
PATENTED JUNE 9, 1903.

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AUTOMATIC FEEDING REGULATOR FOR STEAM BOILERS.

APPLICATION FILED DEC. 17, 1900.

NO MODEL.



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AUTOMATIC FEEDING-REGULATOR FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 730,465, dated June 9, 1903.

Application filed December 17, 1900. Serial No. 40,161. (No model.)

To all whom it may concern:

Be it known that we, HEINRICH LADISLAW and LUDWIG SGAL, subjects of the Emperor of Austria-Hungary, residing at Vienna, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Automatic Feeding-Regulators for Steam-Boilers; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention has relation to automatic boiler feed-regulators; and its object resides in simplifying the construction, and thereby increasing their stability and efficiency, as will now be fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a transverse section of the regulator, showing its connection with a boiler; and Fig. 2 is a longitudinal sectional view thereof.

The regulator consists, essentially, of a horizontal cylinder *c*, in which works a piston *P*, connectible with or secured to the plunger-rod *r* of a feed-water pump of any desired construction, (not shown,) said cylinder being connected to the boiler at different levels. To this end the cylinder has two branches *b* *b'*, leading from its lowest point about midway of its length or midway of the stroke of the piston. The branch *b* is connected to the boiler *B* by a pipe *p* on a line with the normal level *l* of the water in said boiler, and the branch *b'* is connected to said boiler by a pipe *p'* at a point below said normal water-level.

The operation is as follows: As long as the water-level is normal or slightly above normal the cylinder *c* will be full of boiler-water, forced into the same by steam-pressure through pipes *pp'*, thereby antagonizing the movements of the piston *P* and therethrough the movements of the pump-plunger, the stroke of which is shortened or its movement completely stopped, thereby reducing or stopping the supply of water to the boiler. When, on the contrary, the level of the water in the

boiler *B* falls below the normal level *l*, steam is free to flow to the cylinder through pipe *p*, driving the water into the boiler through pipe *p'* and filling the cylinder, thereby balancing the pressure on opposite piston-faces and enabling the piston to work at full stroke, which corresponds to the full capacity of the pump, thereby supplying water to the boiler until the normal level *l* has again been reached, when water will again be forced into the cylinder *c* and the stroke of the piston *P* reduced or its movement stopped.

In order that the described operation of the regulator may take place, the piston *P* should necessarily be of such a diameter relatively to the internal diameter of its cylinder as to leave sufficient clearance between them for the proper flow of fluid to opposite sides of the piston whatever point of the stroke said piston may be at at the time of admission of such fluid, and the more rapidly the fluid is distributed throughout the cylinder the quicker will the piston modify the operation of the feed-pump, as will be readily understood. The combination with the cylinder of a piston of smaller diameter than the internal diameter of said cylinder has the advantage of a saving of labor in that the work of truing the contacting surfaces of the piston and cylinder to cause them to work fluid-tight or the packing of the piston are avoided. Inasmuch as it is not necessary that the piston should work fluid-tight in the cylinder, we may employ a piston that works substantially fluid-tight therein, or, in other words, a piston of such diameter as to leave practically little or no clearance between it and the cylinder, and yet dispense with the labor of truing the contacting surfaces or of packing the piston. In this case means are, however, necessary whereby the distribution of fluid to opposite sides of the piston is effected as rapidly as possible. This we accomplish by forming in the cylinder-walls, midway of its ends or at the half-stroke point, an annular chamber *c'* of greater diameter and cross-sectional area than the diameter and peripheral cross-sectional area of the piston *P*. With this construction and supposing the piston *P* to be on the right-hand side of said annular chamber, Fig. 2, at the time steam flows through pipe

5 *p* into said chamber the water on the left of
 the piston will be driven into the boiler by
 the pressure of the steam through pipe *p'*, and
 as soon as piston *P* has moved to the left-
 hand side of the chamber *c'* steam will also
 10 be admitted to the right of the piston and wa-
 ter from that side of the cylinder driven into
 the boiler by the pressure of the steam. The
 pressure of the latter on opposite faces being
 15 now balanced, the pump can work at full
 stroke. The same operation would take place
 if the piston were on the left-hand side of
 chamber *c* at the time when steam is admit-
 ted to said cylinder. Like operations also
 20 take place in respect of the admission of wa-
 ter to the cylinder *c* when the level of the wa-
 ter in the boiler has risen to or slightly above
 the normal water-level *l* whether the piston is
 on one or the other side of the annular cham-
 25 ber *c'*. If, on the contrary, the piston is at
 half-stroke and in line with chamber *c'*, as
 shown in Fig. 2, at the time steam or water
 is admitted to the cylinder such fluid will
 then flow to opposite sides of the piston at
 30 the same time. This chamber *c'* is, however,
 also of advantage with a piston of less diam-
 eter than the internal diameter of its cylin-
 der in that the fluid admitted is more rapidly
 distributed to either side of the piston, as will
 be readily understood.

Having thus described our invention, what
 we claim as new therein, and desire to secure
 by Letters Patent, is—

35 1. An automatic boiler-feed regulator com-
 prising a horizontal cylinder, means for con-
 necting the same at a point intermediate of
 its ends to a boiler at a point in line with
 the normal level of the water therein and at
 a point below said level respectively, a pis-

40 ton in said cylinder connectible to the plun-
 ger of a feed-water pump, and means admit-
 ting steam or water to either side of said pis-
 ton according as the level of the water in the
 boiler falls below or rises to or above its nor-
 mal level, substantially as set forth. 45

2. An automatic boiler-feed regulator com-
 50 prising a horizontal cylinder, means for con-
 necting the same at its lowest point and in-
 termediate its ends, to a boiler at a point in
 line with the normal level of the water in said
 boiler and at a point below said level respec-
 tively, a piston in said cylinder connectible
 to the plunger of a feed-water pump, and
 means admitting boiler-steam or boiler-water
 55 to either side of said piston according as the
 level of the water in the boiler falls below or
 rises to or above its normal level, substan-
 tially as set forth.

3. An automatic boiler-feed regulator com-
 60 prising a horizontal cylinder, its piston adapt-
 ed to control the movements of a pump-plun-
 ger, said cylinder provided intermediate its
 ends with an annular chamber of greater di-
 ameter and cross-sectional area than the di-
 65 ameter and peripheral cross-section of said
 piston, and means for connecting said cham-
 ber at its lowest point to a boiler at a point
 in line with the normal water-level therein
 and at a point below said level, for the pur-
 70 pose set forth.

In testimony that we claim the foregoing as
 our invention we have signed our names in
 presence of two subscribing witnesses.

HEINRICH LADISLAW.
 LUDWIG SGAL.

Witnesses:

JOSEF RÜBRESCH,
 ALVESTO S. HOGUE.