

(No Model.)

2 Sheets—Sheet 2.

J. W. FUNCK.

AUTOMATIC DAMPER REGULATOR.

No. 258,639.

Patented May 30, 1882.

Fig. 4.

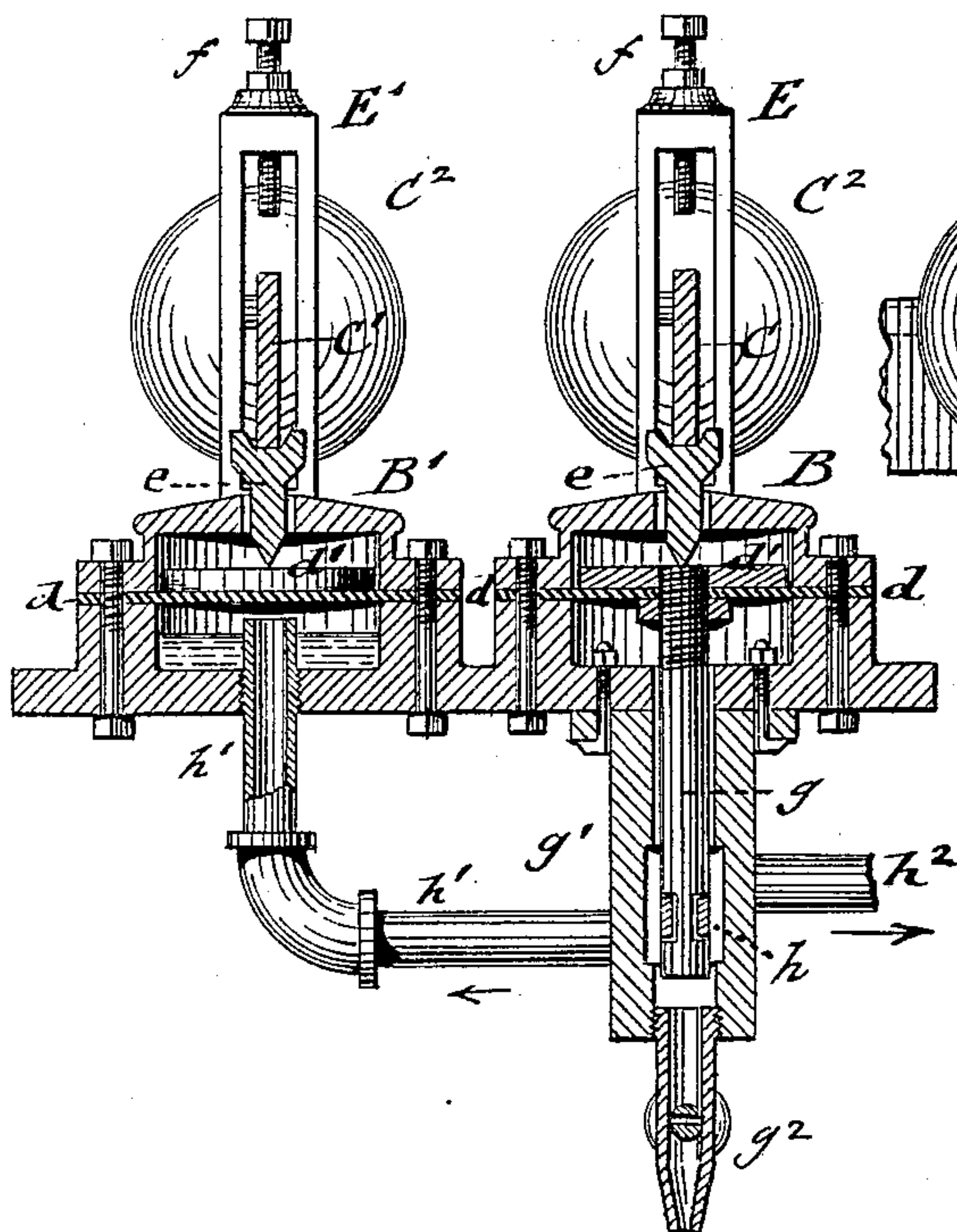


Fig. 5.

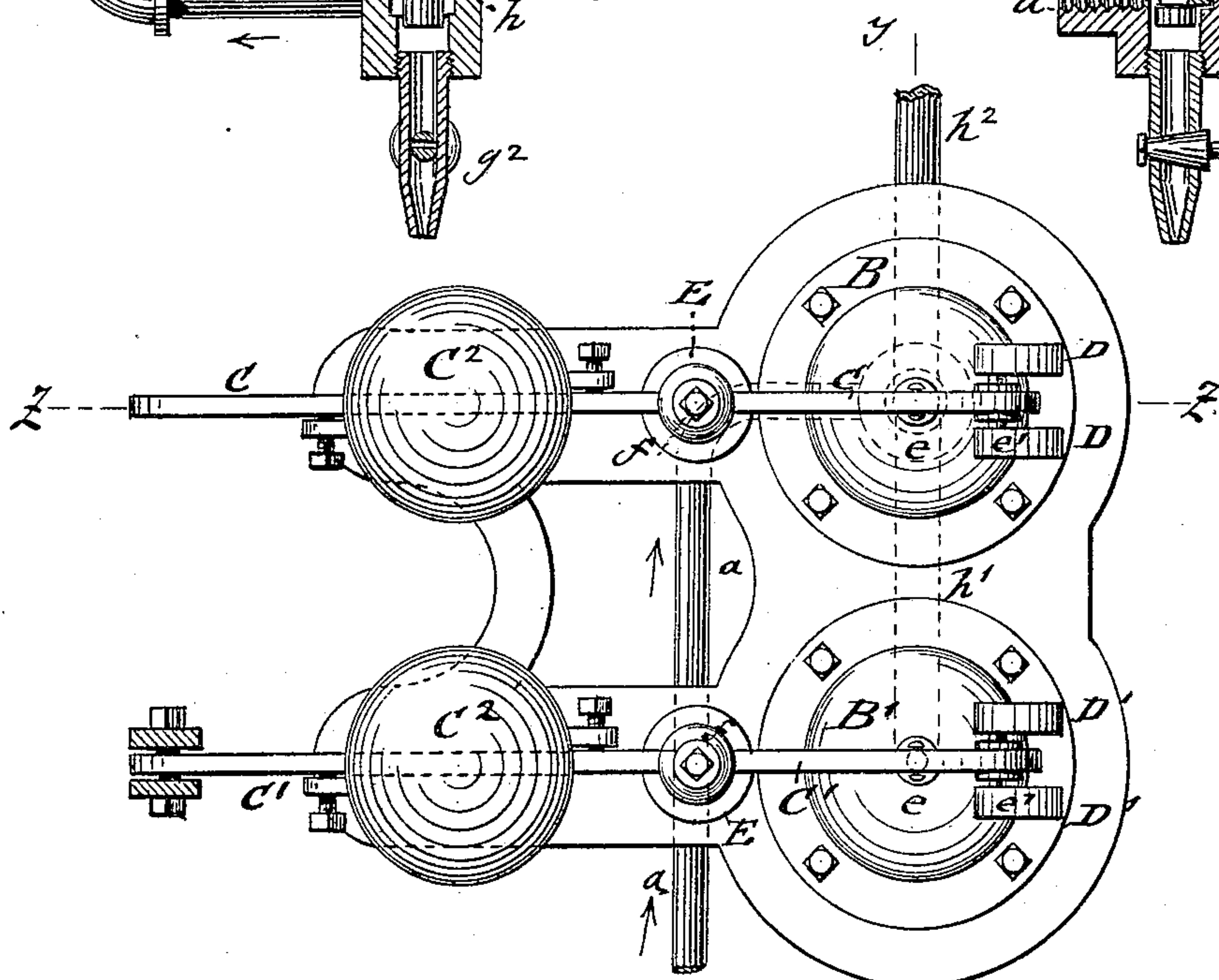
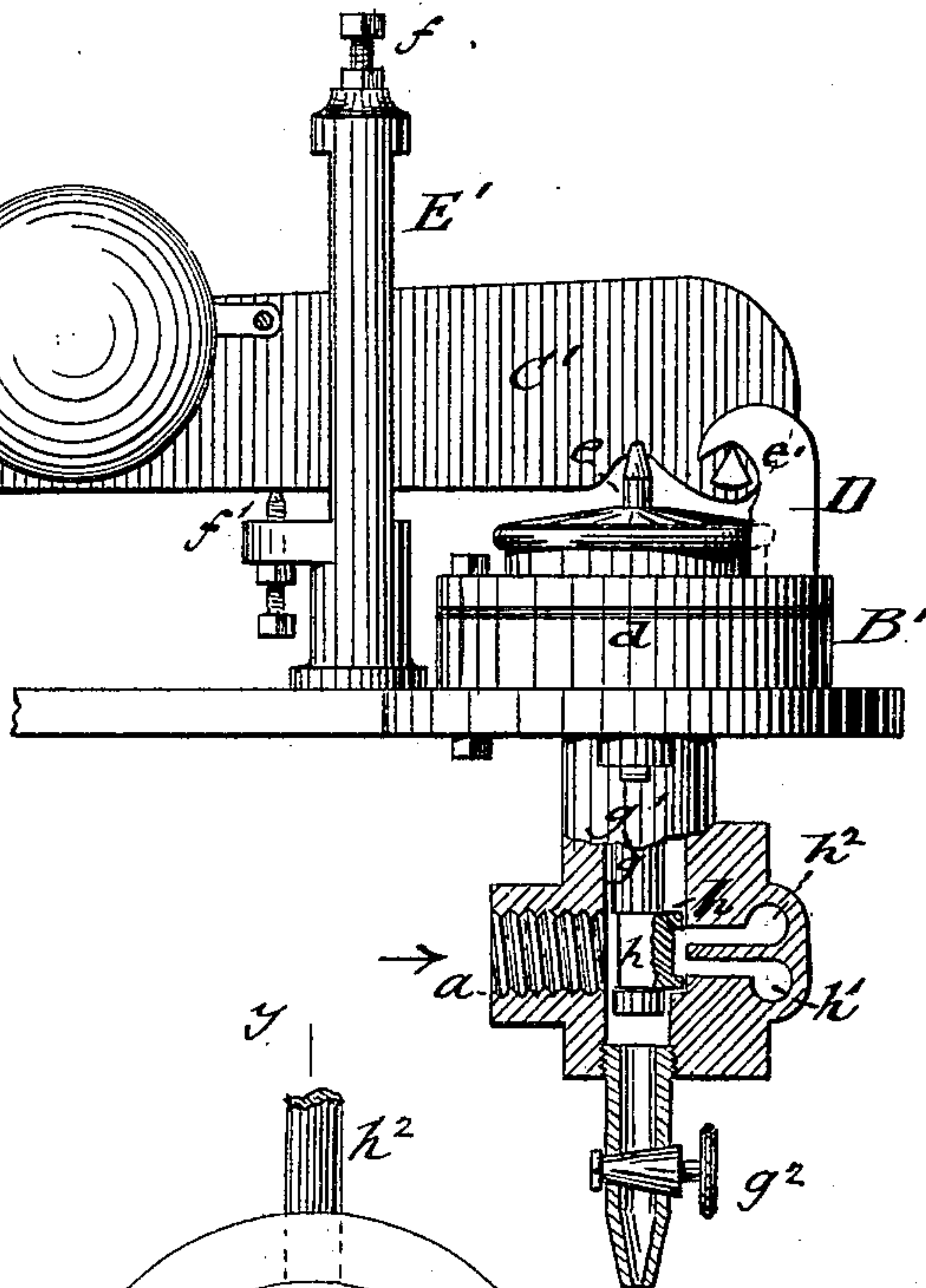


Fig. 3

WITNESSES:

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JOHN W. FUNCK, OF STAPLETON, NEW YORK.

AUTOMATIC DAMPER-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 258,639, dated May 30, 1882.

Application filed January 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILLIAM FUNCK, of Stapleton, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Automatic Damper-Regulators, of which the following is a specification.

This invention relates to an improved automatic damper-regulator for steam-boilers, in which the steam is not employed directly for regulating the damper, but a certain quantity of the water of condensation which is acted upon by the steam-pressure in the boiler. This has the advantage that it prevents the contact of steam with the diaphragms of the damper-regulating device, and secures the more reliable operation of the same.

The invention consists of an automatic damper-regulator which is composed essentially of two separate working-cylinders with pistons and elastic diaphragms, the diaphragm of the first cylinder being worked directly by the pressure of the water of condensation in a vertical stand-pipe, so as to operate a slide-valve which admits the water of condensation to the second working-cylinder, the diaphragm and piston of which works a weighted lever, and thereby a suitable lever-connection with the damper of the smoke-flue. The weighted levers of both cylinders are adjusted to the required degree of pressure in the boiler, and arranged to press by pointed spindles upon the piston of the diaphragms, as will appear more fully hereinafter, and finally be pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of a steam-boiler with my improved automatic damper-regulator arranged in connection therewith. Fig. 2 is a vertical transverse section of the same on line *x x*, Fig. 1. Fig. 3 is a detail plan view of the damper-regulator, drawn on an enlarged scale. Fig. 4 is a vertical transverse section on line *y y*, Fig. 3; and Fig. 5 is a side elevation of the same, partly in section on line *z z*, Fig. 3.

Similar letters of reference indicate corresponding parts.

My improved damper-regulator is arranged at any suitable point convenient to the damper in the smoke-flue of the boiler-furnace, it being connected by a pipe, *a*, with a vertical

stand-pipe, *P*, which is again connected at the upper end by a pipe, *b*, to the front wall of the furnace, and by a return-pipe, *b'*, to the steam-dome, as shown in Figs. 1 and 2, so as to admit steam to or shut it off from the regulator in a convenient manner. The steam conducted from the boiler to the stand-pipe *P* is condensed in the lower part thereof, the water of condensation being under the same pressure as that in the boiler, and employed for working the damper-regulator by the connecting-pipe *a*.

The damper-regulator is constructed of two separate cylinders, *B B'*, having each an elastic diaphragm, *d*, which is secured tightly thereto by the top plate of each cylinder *B B'*. To the upper surface of the diaphragms *d* are applied metallic pistons *d'*, upon the centers of which rest the lower pointed ends of upright spindles *e*, the upper knife-edged ends of which support weighted levers *C C'*, which bear, by knife-edged side studs, *e' e'*, in front of their fulcras, against fixed standards *D D'* of the cylinders. The weight *C²* of each lever rides upon the lever, and is applied thereto by means of clamping-screws applied through ears at opposite sides thereof, the levers being extended backward far enough to provide for the adjustment of the weight to different pressures in the boiler. The levers are guided in slotted standards *E E'*, and stopped by set-screws *f f'* in either direction, as shown clearly in Fig. 5.

The diaphragm of the first or starting cylinder, *B*, is provided with a downwardly-extending spindle, *g*, which is inclosed by a cylindrical casing, *g'*, the lower end of the spindle having side recesses for supporting the forked end of a side valve, *h*, which serves to establish or interrupt the communication of the casing *g'* with a pipe, *h'*, that forms the connection of the first cylinder, *B*, with the second or working cylinder, *B'*, and also of the supply-pipe *h³*, as shown in Fig. 5. The cylindrical casing *g'* below the starting-cylinder *B* is closed below the spindle of the slide-valve by a stop-cock, *g²*, in the same manner as the lower end of the stand-pipe *P*, so as to discharge the water of condensation thereby whenever it is desired to clean the pipes of the entire damper-regulating mechanism.

The first cylinder, B, is supplied with water of condensation directly from the stand-pipe P by the pipe *a*, the water of condensation passing around the spindle *g* in the casing *g'* into the space below the diaphragm *d'*. The weight on the lever of the first cylinder is so adjusted to the pressure desired in the boiler that the diaphragm *d* is held in equilibrium by the action of the weight on its top and that of the steam-pressure on its bottom side. If the pressure increases the diaphragm in the first cylinder is raised, while it recedes when the pressure decreases. This causes the raising or lowering of the slide-valve *h*, connected to the spindle *g*, and establishes communication with the pipe *h'* and the second cylinder, B', so that the water of condensation will lift the diaphragm of the same. The weighted lever of the second cylinder, B', is thereby lowered and the damper in the smoke-flue partly or entirely closed by an intermediate lever transmission, *i i'*, which connects the rear end of the lever C' with the damper F, as shown clearly in Fig. 2. The draft in the chimney is thereby reduced and the generation of steam in the boiler gradually diminished. The pressure in the boiler is thereby decreased. The diaphragm of the first cylinder and the side valve is lowered and placed in the position shown in Fig. 5, so that direct communication is established between the connecting-pipe *h'* and the discharge-pipe *h''*, and thereby the water of condensation discharged from the second cylinder, B', to the outside. The lowering of the water-level in the second or working cylinder up to a level with the inner end of the pipe *h'* will cause the receding of the diaphragm of the same and the returning of the damper into partly or entirely open position, so as to increase the draft and the generation of steam in the boiler. By the alternating play thus continually taking place the draft is regulated, and a normal steam-pressure secured in the boiler.

The damper-regulator operates in a reliable and accurate manner, owing to the separation of the work, which is partly done by the first or starting cylinder and partly by the second or working cylinder.

The regulator is more durable and reliable than those operated by steam, as there is less wear upon the working parts of the mechanism.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a steam-boiler-furnace damper-regulator, two separate cylinders both having elastic diaphragms, the weighted regulating-levers, a slide-valve actuated by the starting-cylinder, a communication between the said diaphragms, an outlet for the surplus water of condensation from said starting-cylinder, and a stand-pipe communicating with the steam-ovens of the boiler and with the starting-cylinder, substantially in the manner and for the purpose described.

2. The combination of a starting-cylinder having an elastic diaphragm acted on by a weighted lever, a spindle fixed to the diaphragm, a valve applied to guide-recesses of the spindle, the supply and discharge pipes, the second or working cylinder, its diaphragm and loaded lever, and a stand-pipe communicating with the steam-boiler and the first cylinder, substantially as described.

3. The combination of the two cylinders B B', their diaphragms and loaded levers, the receiving and discharge pipes, and a valve applied to the spindle, substantially as described.

4. The combination of the damper, the transmitters between this damper, a loaded lever *c'*, the diaphragms in the two communicating cylinders B B', the loaded lever applied to the diaphragm of the cylinder B, the valve applied to the spindle in the latter cylinder, and the stand-pipe communicating with the steam-boiler and with the cylinder, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOHN WILLIAM FUNCK.

Witnesses:

PAUL GOEPEL,
CARL KARP.