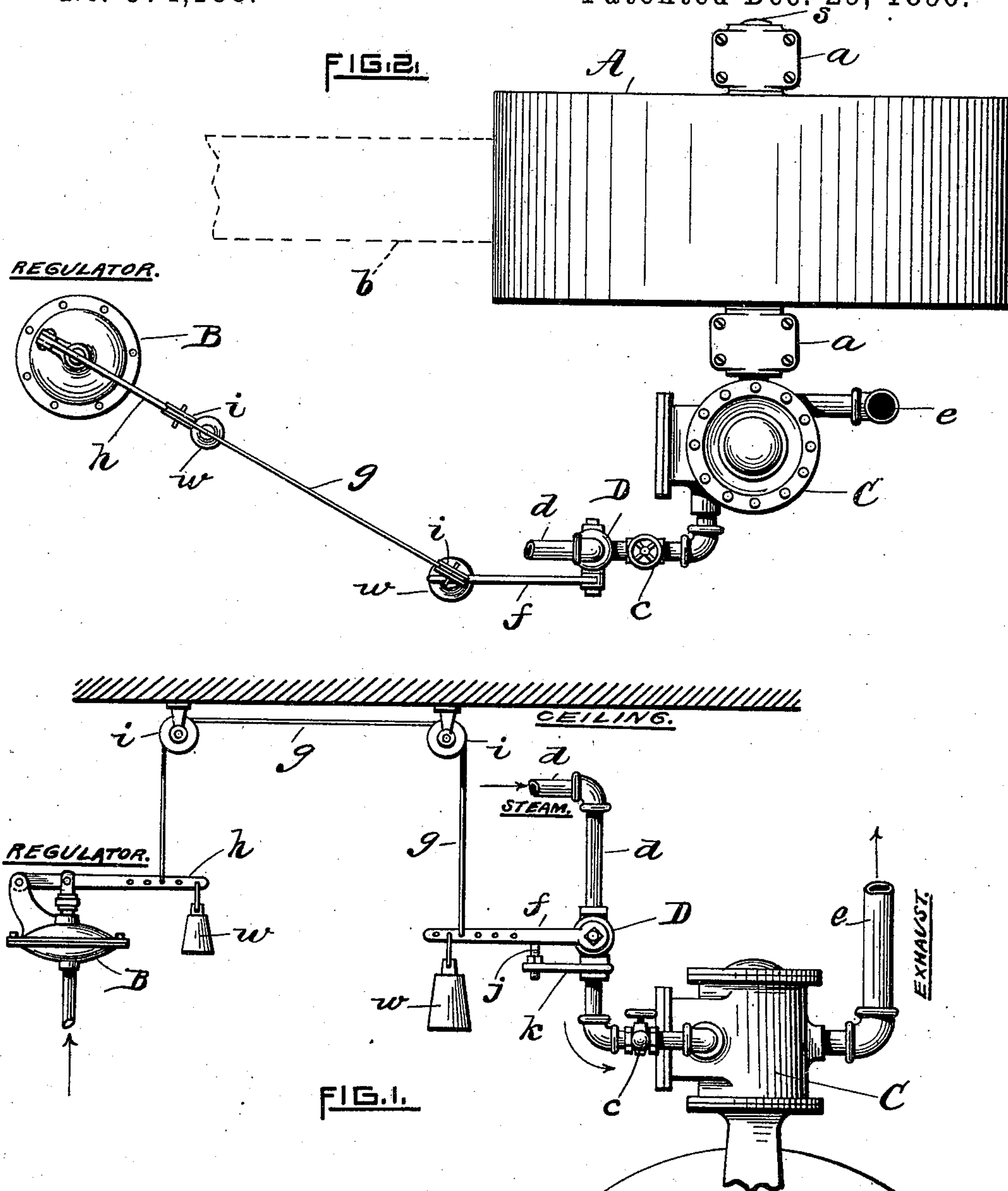


(No Model.)

T. P. BURKE.  
AUTOMATIC BLOWING APPARATUS.

No. 574,188.

Patented Dec. 29, 1896.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

THOMAS P. BURKE, OF PAWTUCKET, RHODE ISLAND.

## AUTOMATIC BLOWING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 574,188, dated December 29, 1896.

Application filed September 4, 1896. Serial No. 604,842. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS P. BURKE, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Automatic Blowing Apparatus for Steam-Boilers; and I do 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 the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in automatic blowing apparatus for steam-boilers; and it consists, essentially, of a steam-regulator of the diaphragm or other approved type, a blower connected with the ash-pit of the boiler, an independent steam-engine operating the blower and supplied with steam from the boiler, and a throttle-valve operated by a lever which is connected with the arm of the steam-regulator in such a manner that any increase in the pressure within the boiler will operate the throttle-lever simultaneously with the arm of the regulator; and the object of my invention is to provide a means for automatically supplying the fire with the requisite amount of draft to maintain a constant steam-pressure within the boiler without the necessity of supervision on the part of the fireman. I accomplish this object by the apparatus shown in the accompanying drawings, in which—

Figure 1 shows the blower, (cut away at the bottom,) the cylinder of the engine operating the blower, (its standard also being cut away to disclose the blower below,) the throttle-valve, with its lever, governing the admission of steam to the cylinder, the regulator, with its arm, and the connection between the regulator-arm and the throttle of the engine. Fig. 2 is a plan view of my device, showing the same apparatus viewed from above.

The same parts are designated by the same letters throughout.

My device is specially applicable to boilers where fuel of a low grade is used, such as sawdust, shavings, coal-screenings, &c., as well as to boilers so located that the natural draft is not sufficient for the maintenance of

a proper steam-pressure, although my device can be applied to any kind of boiler in any situation or under any and all circumstances.

In Fig. 1, A is the outer case of an ordinary revolving-fan blower of any of the common patterns now in use. C is the cylinder of a small engine operating the blower and supplied with steam through the steam-pipe *d d*, and having its exhaust-pipe as shown at *e*. *c* is the supply-valve that feeds the cylinder, and D is a throttle-valve having a long lever-arm *f* operating the same. *f* is pierced with holes, and upon it is hung the weight *w*. Connected with *f* is the band or chain *g*, passing through the pulleys *i i* and fastened at its other end to the lever *h* of the diaphragm-regulator B. This regulator is connected in the ordinary manner with the boiler which supplies the cylinder C. *s* is the shaft upon which the fan of the blower A revolves.

In Fig. 2, *a a* are bearings for the shaft *s*, and *b* shows the draft tube or pipe passing from the blower A to the ash-pit of the boiler.

Immediately below the lever *f* is a projecting arm *k*, having upon it the set-screw and lock-nut *j*, the use of which will be explained hereinafter. Any good commercial form of regulator which is serviceable for high as well as low pressures may be used, and any of the various blowers now in common use will answer the purpose of my invention equally well.

My device operates as follows: Let it be supposed that the pressure at which the steam is to be kept is one hundred pounds to the square inch. When the fire is first started, the regulator-arm *h* will be depressed to its lowest position and the lever *f* will be raised to its highest position, leaving a free and open passage in the throttle-valve D. When a few pounds of steam are upon the boiler, the valve *c* is opened and the blower begins to operate. It continues operating with nothing to check its speed, the fire consequently becoming hotter and the steam-pressure in the boiler rising rapidly. When the required pressure is reached, the regulator-arm *h* goes up, the lever *f* of the throttle-valve D does down, and the steam is thus shut off from the cylinder C and the blower would ordinarily cease to operate but for the device shown at *j k*. It



is of course important that the engine which operates the blower should never be caught upon a dead-center, and it is also desirable that it should never stop running entirely while the boiler is in use. To accomplish these ends, the set-screw *j*, with its check-nut, is so adjusted as to check the throttle-lever *f* just before the steam is entirely cut off from the cylinder C, thus admitting sufficient steam to keep the engine in motion, but so slowly as not to furnish any appreciable draft to the boiler. The draft being cut off from the boiler by the reduction in the speed of the blower, the steam-pressure immediately goes down. If it falls below one hundred pounds, the throttle D is again opened, as before, the speed of the blower increases, the fire burns more fiercely, and the pressure again reaches the required point, and thus indefinitely.

Practical experiment has shown my device to be of an unusually sensitive nature, keeping the steam in the boiler with ordinary and unskilful firing to within a pound of the required pressure under any and all conditions of load upon the driving-engine. It is to be understood that the engine shown in the drawings is not the engine which operates the works or manufacturing establishment where the boiler is located, the engine shown being a small independent engine having no other work to perform than the operating of the blower. It is also to be understood that no other draft is permitted to the boiler except that furnished by the blower shown.

The use of my invention has been attended with a marked economy in the boilers con-

nected therewith, as the very lowest grade of fuel can be used with excellent results, and as very little attention on the part of the fireman is needed, the firing in most cases being as well done by an unskilful as by a skilled fireman.

I am aware that the regulator, the blower, and the engine shown are separately old and well known in the arts, but I am not aware that the combination of the same to produce the result described has ever been made known or used before my invention, and I further believe that my device for checking the throttle-lever, so as to prevent the total closing of the valve, is also a novel invention.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

In a blowing apparatus for steam-boilers, a regulator, connected to the boiler and operated by the steam-pressure, the steam-pipe, provided with a valve D, and the blower-engine connected to the steam-pipe, combined with the weighted lever *f*, connected to the valve D, a supporting-arm *k*, a regulating-nut *j*, passed through the arm and bearing against the lever to prevent the valve from entirely closing; and a flexible connection between the lever *f*, and the regulator-lever, substantially as shown.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS P. BURKE.

Witnesses:

GEORGE INGRAHAM,  
LELLAN J. TUCK.