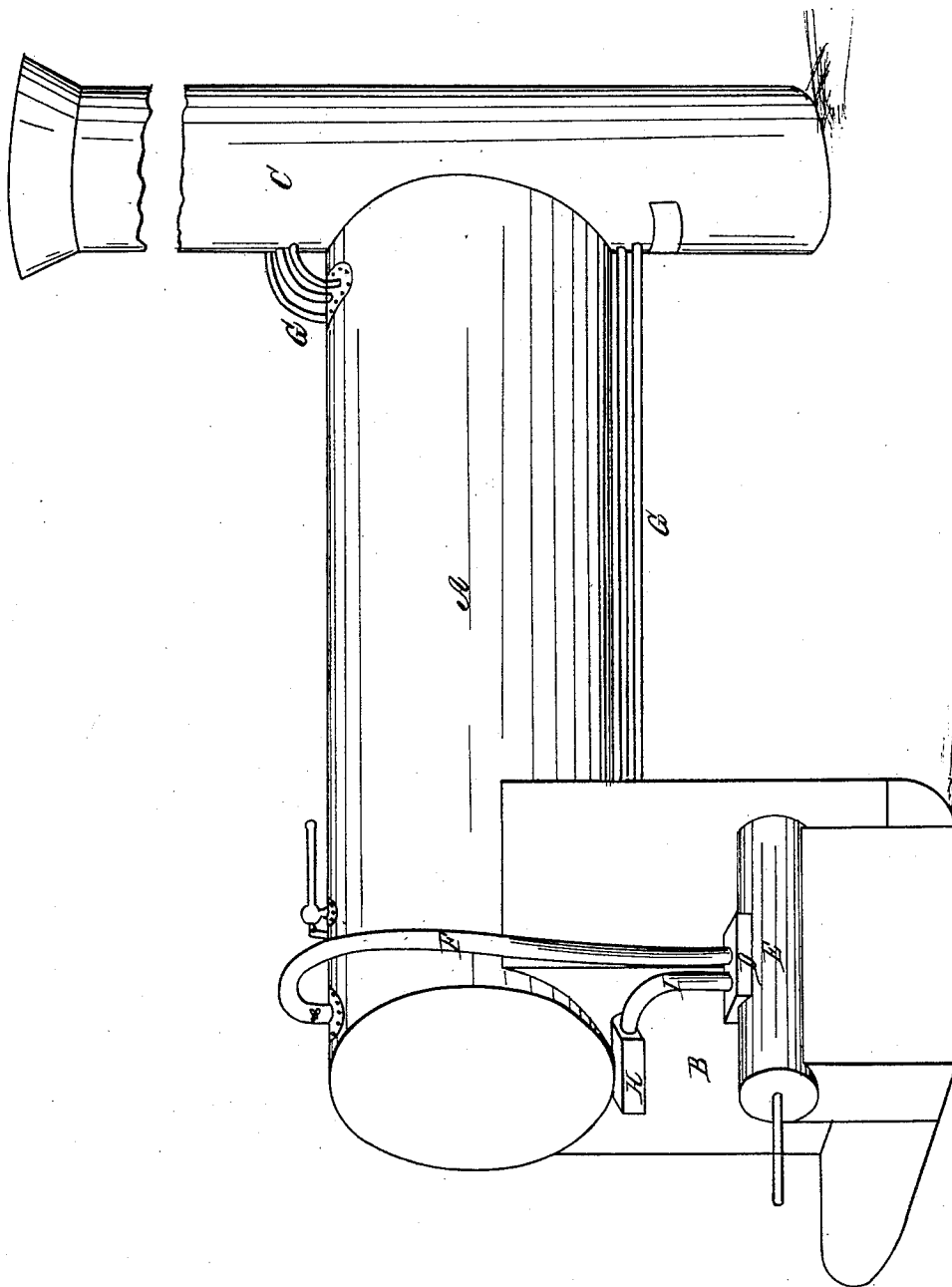


C. E., J. & S. WETHERED.
STEAM BOILER.

No. 10,054.

Patented Sept. 27, 1854.



UNITED STATES PATENT OFFICE.

CHARLES E. WETHERED, JOHN WETHERED, AND SAMUEL WETHERED, OF
BALTIMORE, MARYLAND.

IMPROVEMENTS IN THE USE OF STEAM FOR ACTUATING ENGINES.

Specification forming part of Letters Patent No. **10,054**, dated September 27, 1853.

To all whom it may concern:

Be it known that we, CHARLES E. WETHERED, JOHN WETHERED, and SAMUEL WETHERED, of Baltimore, Maryland, have invented a new and useful Improvement in the Application of Steam for Motive and other Purposes, which we desire to secure by Letters Patent; and we do hereby declare that the following is a full and exact description of our said improvement.

We attach to the space in the boiler occupied by the steam two or more pipes, one passing directly to the steam-chest on the cylinder and the other or others passing through the furnace either directly, also, to the steam-chest or into the first-mentioned pipe before the latter enters the steam-chest, or into a common reservoir, into which the first and last mentioned pipes alike discharge themselves, and between which and the steam-chest there is a pipe of communication; or the superheated steam-pipes may be conducted into a single pipe which may pass inside of the regular steam-pipe to the steam chest or cylinder of the engine; or the steam-pipe may be placed within the superheated pipe.

The steam passing through the first of the above-mentioned pipes is that ordinarily used as the motive power of the machinery where the application of the steam is to propel machinery, and is more or less dry, according to circumstances. The steam, passing through the pipe or pipes, which in their turn pass through the furnace, and becoming dried and heated in its passage, is converted into what is known as "superheated steam" (or stame) of a much higher temperature than that which passes directly to the steam-chest. When the ordinary and superheated or surcharged steam (or stame) are united in any of the ways above suggested, any water in the first is at once converted into steam, (or stame,) which passes into the cylinder along with the steam that left the boiler with an increased expansion, due and in proportion to the heat of the surcharged or superheated steam, (or stame,) the result being the working of dry steam at a greater pressure than if the steam had been permitted to pass into the cylinder in the usual way.

In the experiments we have made the draft of the cylinder has been sufficient to create the current through the pipes—that is to say, the steam and the surcharged or superheated steam-pipes—which is necessary to discharge their respective contents in combination into the cylinder; but should the draft not be sufficient a cut-off or flutter valve for the purpose of creating a greater current may be used; or any other convenient plan may be resorted to by which the surcharged or superheated steam (or stame) may be forced through the surcharging or heating pipe or pipes. In our experiments, also, we have passed the pipes for surcharging the steam through the furnace; but this may not always be the best mode. It may answer a good purpose where much heat escapes through the chimney or smoke-stack to make it available for surcharging or superheating the steam by conveying the pipes containing the latter into the stack itself; or it may be found more economical to have a separate furnace for heating the surcharging-pipes, as circumstances must determine the best mode in each particular case. In the experiments made by us we employed the mode here described of passing the surcharging or heating pipes through the furnace. Shutting the cocks upon them, we found the engine to work with the direct steam-pipe with the usual effect. Then shutting the cock in the last-named pipe and opening the cock in the others, so as to work the engine with surcharged or superheated steam only, we found that it was less efficient than when worked with steam only. Then opening both connections, so as to allow the steam and surcharged or superheated steam to enter the cylinder together, we found an immediate and great increase in the power of the engine without any increased consumption of fuel or any diminution in the amount of steam, due to the fire in the furnace, under ordinary circumstances. The *rationale* for this result is already given in the effect of the surcharged or superheated steam to convert into steam any watery particles passing over directly from the boiler, thereby drying it, increasing its volume, and expanding it in proportion to the additional heat imparted to it.

It will be seen from the foregoing that while we have described a mode of putting our invention into practical and useful operation, which is further described by the drawing which forms a part of our specification, yet our invention is independent of any particular form or proportions. In our experiments the diameter of our steam-pipe was two and three-eighths inches and its length nine and one-half feet. The diameter of the three surcharging or heating pipes was one and three-fourths inch each and their length fifteen feet, of which three and a half feet were subject to the direct action of the furnace-heat, and the engine itself was that known as a "twelve-horse-power" engine, and these proportions we found to answer well, the draft of the cylinder being sufficient to produce a current in both pipes.

A is a common cylindrical boiler; B, furnace; C, smoke-stack or chimney; D, steam-chest; E, cylinder; F, the usual steam-pipe; G, surcharging-pipes passing into the smoke-

stack, thence into the flue beneath the boiler, and thence through the furnace into the box H; H, a box receiving the three surcharging-pipes; I, a pipe communicating between the box H and the steam-chest D.

Note.—In the drawing three surcharging-pipes are shown discharging into a box, whence their contents are carried to the steam-chest. Were one surcharging-pipe only used, no such box would be necessary.

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

The combining steam and superheated or surcharged steam for actuating engines when generated, the elasticity increased, and operated as herein set forth.

CHAS. E. WETHERED.

JNO. WETHERED.

SAMUEL WETHERED.

Witnesses:

WM. H. BAYZAND,

JOHN L. SNYDER.