

J. C. Walker,
Steam-Boiler Indicator.
N^o 69,729. Patented Oct. 8, 1867.

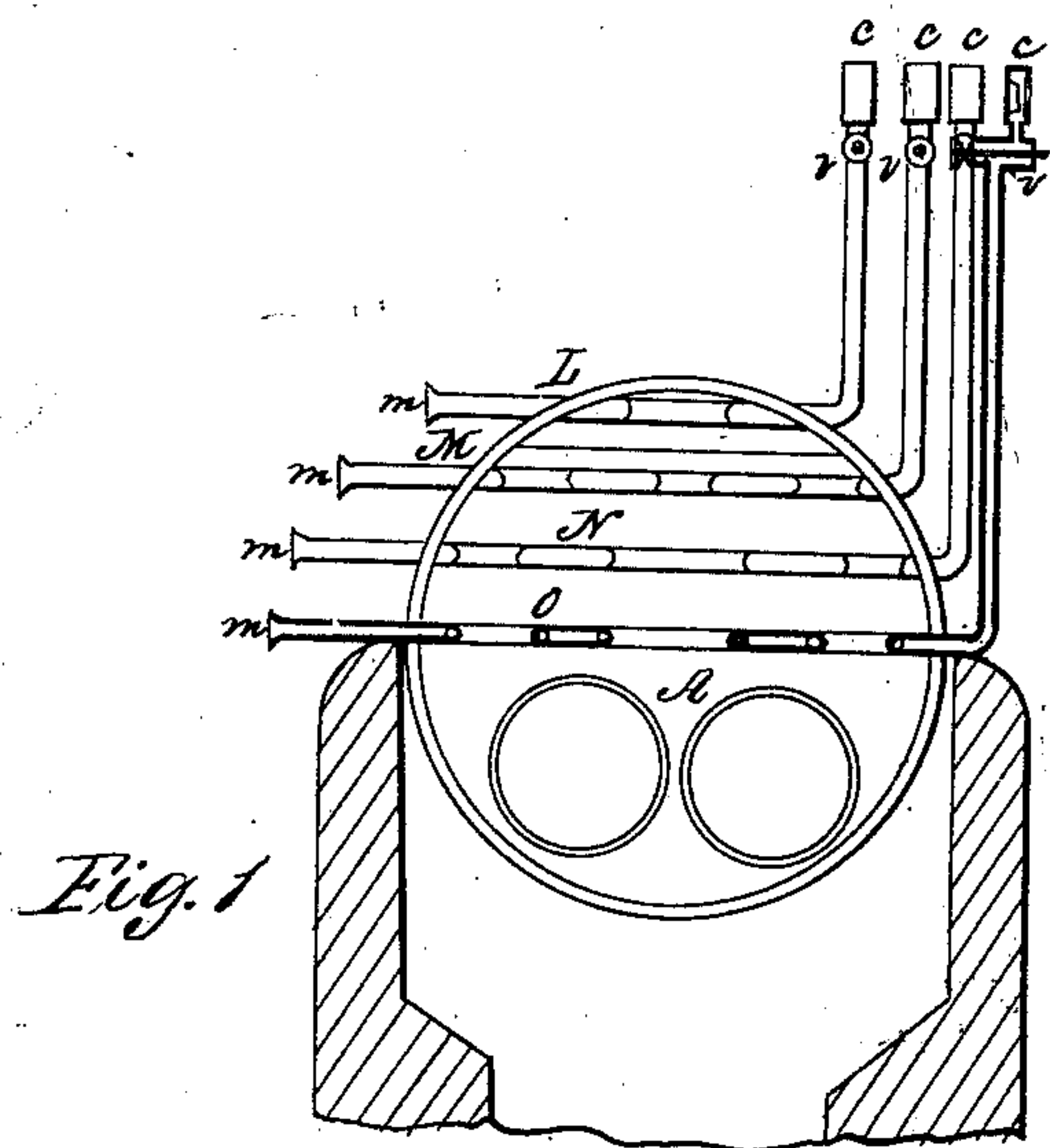


Fig. 1

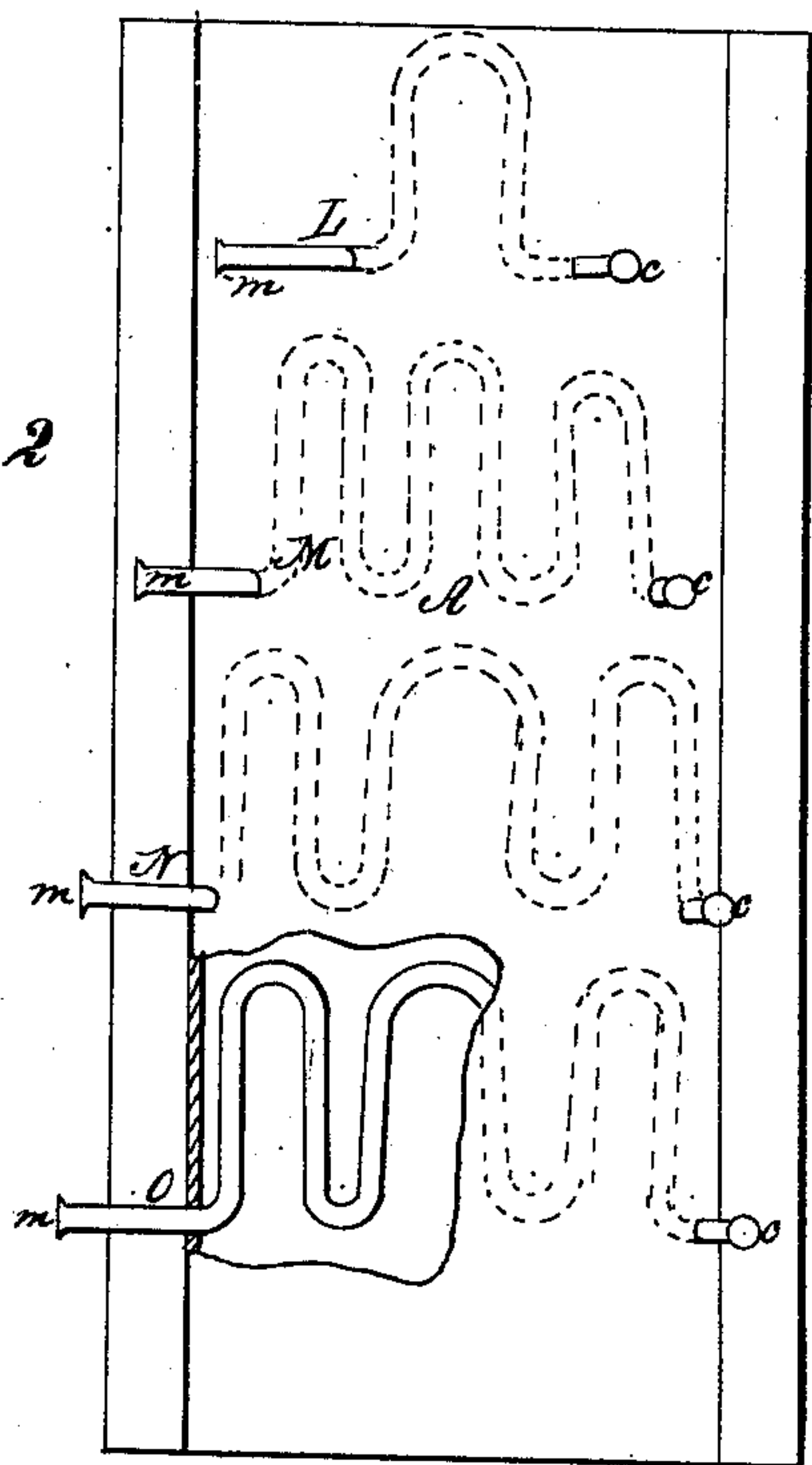


Fig. 2

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United States Patent Office.

JAMES C. WALKER, OF WACO VILLAGE, TEXAS.

Letters Patent No. 69,729, dated October 8, 1867.

IMPROVEMENT IN HOT-AIR, STEAM, AND WATER-GAUGE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JAMES C. WALKER, of Waco village, in the county of McLennan, and State of Texas, have invented a new and improved Hot-Air Harmonic Steam and Water-Gauge; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and in which--

Figure 1 is a vertical cross-section of a boiler containing my apparatus.

Figure 2 is a horizontal longitudinal section of the same.

Similar letters of reference indicate corresponding parts in the two figures.

In this invention several tubes pass through the boiler, some under and some above the water, through which currents of air are induced by the heat of the water or steam surrounding them. These currents are made to sound musical notes, and thus indicate the condition of the steam and water in the boiler.

In order that others skilled in the art to which my invention appertains may be enabled to make and use the same, I will proceed to describe it in detail.

In the drawings, A represents the boiler, and L, M, N, and O are four tubes, about an inch in diameter, passing horizontally through the boiler at different heights, two above and two below the water level, and, if necessary, at different points in the length of the boiler. The tubes may pass transversely or longitudinally through the boiler, and they may be convoluted or enlarged into boxes or chambers within the boiler, if necessary, in order to increase the heated surface acting upon the air within them. One end of the tubes is bent upwards, and rises eight or ten feet above the boiler. The opposite end may be expanded, as at *m m*, to admit the air freely, and may, if desirable, be extended into a cold-air chamber, or to the outside of the building. Near their upper extremity, at *v v v*, all these tubes are provided with valves, which will under ordinary circumstances remain closed, but when the tubes are greatly heated and a powerful current of hot air is started in them, will open and allow it to escape through the top of the tubes. *c c c* are musical instruments, whistles, or reeds of different musical pitch, fixed in the tubes and easily operated by the ascending currents of air. When I use four tubes, as shown in the drawings, I would ordinarily attach four reeds, whose whole compass would be an octave, the reeds attached to the two upper pipes that pass through the steam-chest uttering the low notes, *do mi*, and the reeds attached to the two lower tubes that pass through the water uttering the higher notes, *sol do*, of the musical scale.

The operation of such an instrument will be as follows: The strength of the current of hot air generated in the tubes will depend entirely upon the heat to which the tubes are subjected, as they come in contact with the water and steam in the boiler. The valves *v v v* are made to open by the direct expansion of the air in the bent tubes, and by the force of the current thus formed impinging against them, just as the ordinary safety-valve of boilers is opened, and are adjusted so as to open, one by a current of a certain degree of force, another by a current of greater force, &c., &c., being simply safety-valves applied to the tubes and properly adjusted. In ordinary safe conditions of the steam in the boiler, the expansion of the air in the tubes L M N O will not be sufficient to open any of the valves, and no sound will be emitted; but if the steam become in any degree superheated, the two upper tubes L and M will open their valves and sound the low notes, indicating that caution must be exercised. If in consequence of dangerous pressure within the boiler, or of the water becoming too low, the boiling point of the water should be raised, and the water itself become superheated, the lower tubes N and O will open their high shrill notes and sound the alarm far and wide, thus indicating the height of the water in the boiler, as well as the condition or temperature of the water and steam. It will be observed that if the steam or water in the boiler becomes heated beyond its ordinary safe running temperature, the valves will at once open and make known the fact; but any additional pressure of the steam in the boiler will cause the heat of both steam and water to be increased, and will therefore be unerringly indicated by the apparatus.

I may, instead of the particular arrangement above described, use notes of any other pitch than those designated. I may also entirely dispense with the valves in the upper pipes L M, permitting them to sound constant concordant notes when the boiler is safe, and indicating the danger by the opening of the notes of the pipes N and O.

I do not desire to confine myself to any particular arrangement or combination of sounds to give the alarm at any required condition of the steam pressure in the boiler, but desire to be at liberty to use any arrangement of them which may suit my fancy or be found better in practice than that above indicated.

In operation this instrument will be found an exceedingly delicate and perfect indicator of the condition of the boiler. Not only will it show the pressure of the steam by the opening and closing of the valves, and the fact that the notes are sounded or not, but while the notes are sounding the force and shrillness with which their tones are emitted will indicate with perfect accuracy to the ear of the engineer or workmen employed about the building the exact condition of the heated steam and water, and every change in that condition.

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

1. The pipes L M N O, passing through steam-boilers as above described, as and for the purpose set forth.
2. The combination of the boiler A, the pipes L M N O, the valves *v v v v*, and the reeds or whistles *c c c c*, substantially as and for the purpose specified.

JAS. C. WALKER.

Witnesses:

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