C. F. THOMAS.

MEANS FOR MEASURING DRAFT IN LOCOMOTIVES.

No. 13,238. Patented July 10, 1855.

Fig: 5.

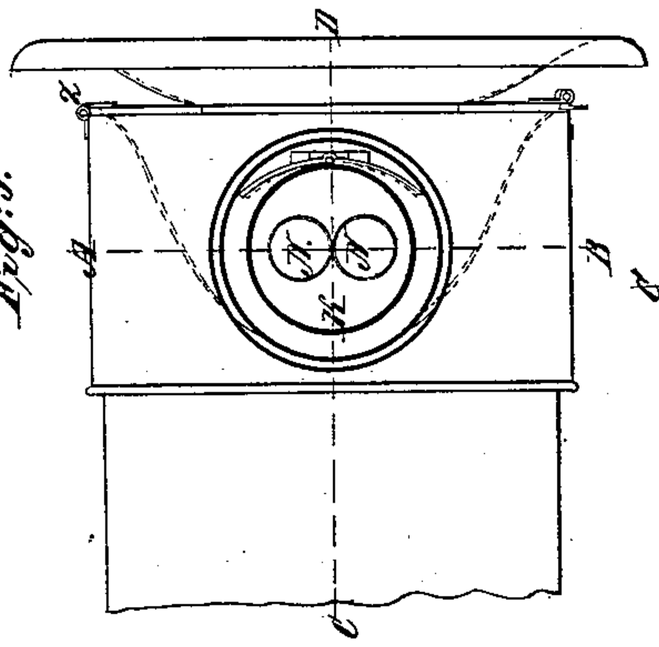


Fig: 6.

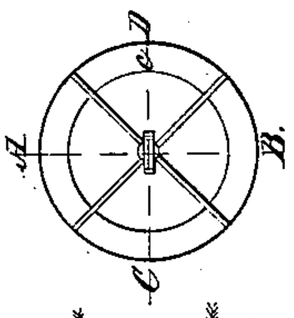


Fig: 9.

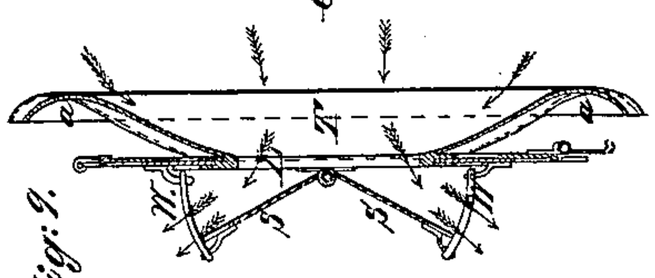


Fig: 8.

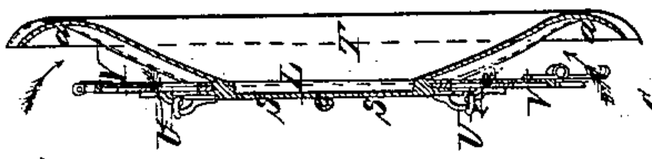


Fig: 7.

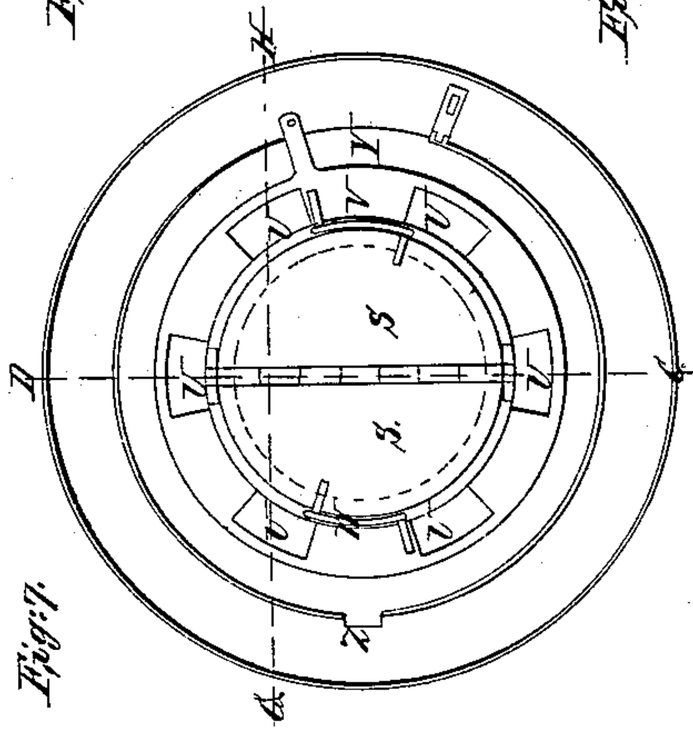


Fig: 4.

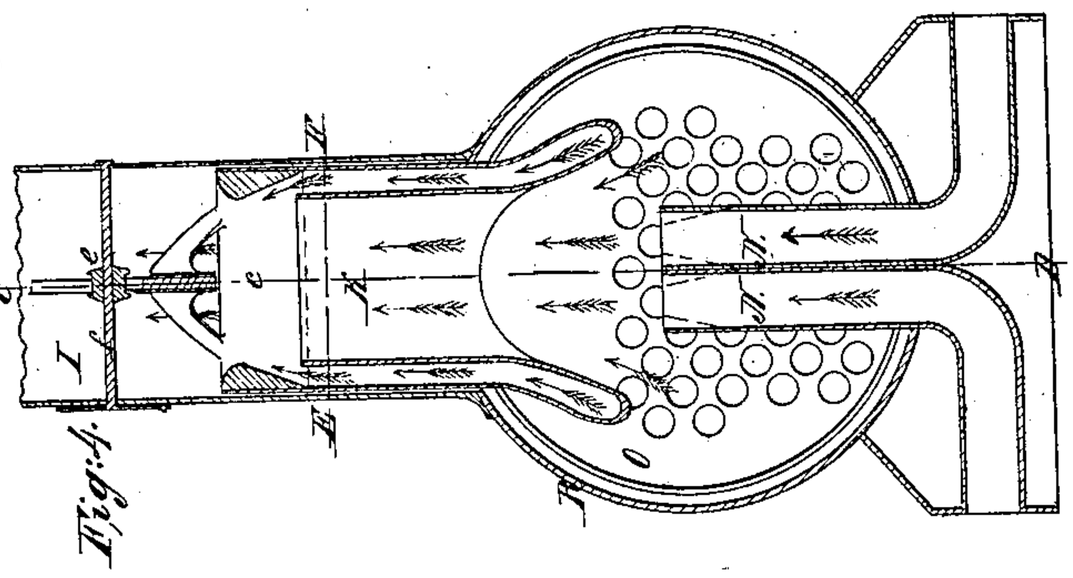


Fig: 3

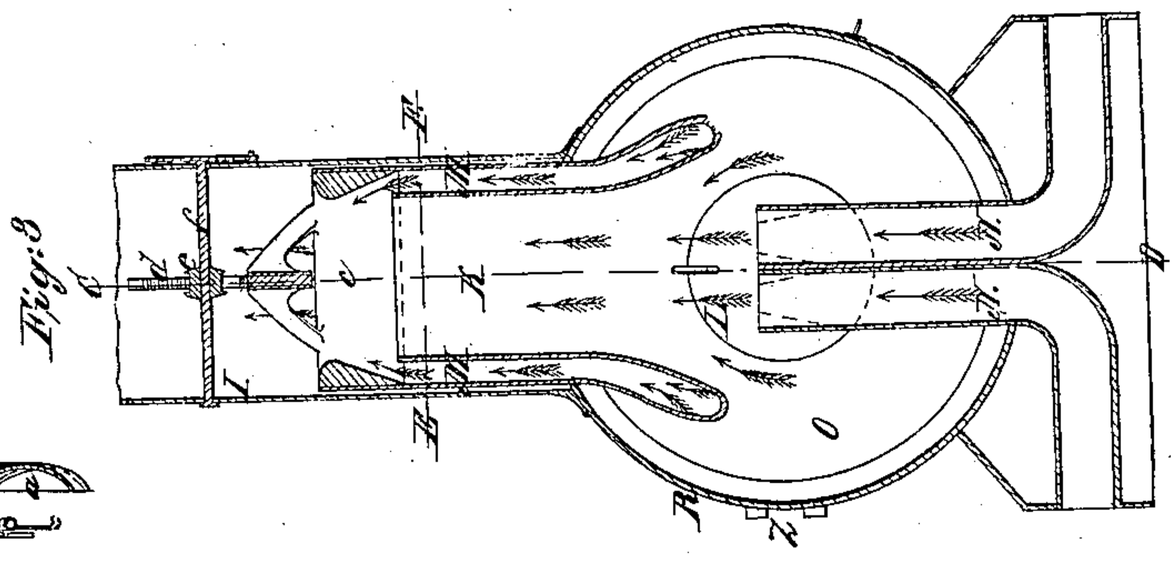


Fig: 2.

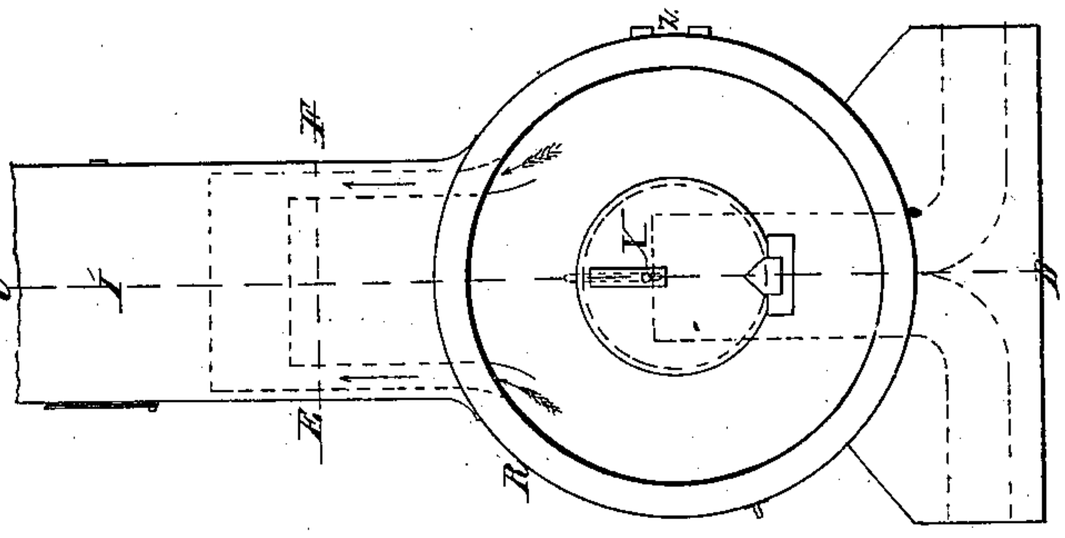
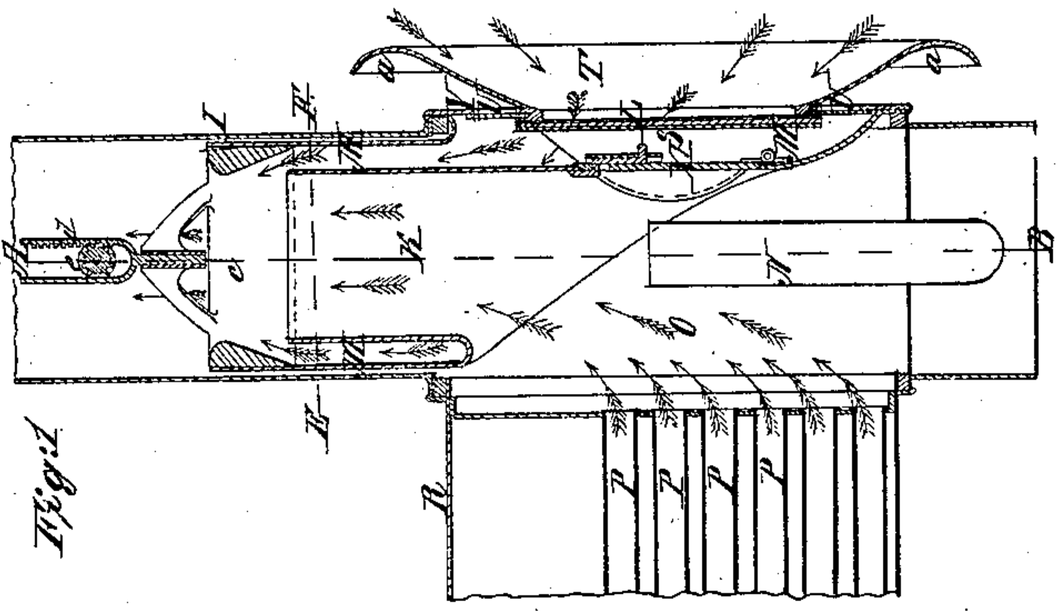


Fig: 1.



UNITED STATES PATENT OFFICE.

CHARLES F. THOMAS, OF TAUNTON, MASSACHUSETTS.

MEANS FOR INCREASING DRAFT IN LOCOMOTIVES.

Specification of Letters Patent No. 13,238, dated July 10, 1855.

To all whom it may concern:

Be it known that I, CHARLES F. THOMAS, of Taunton, in the county of Bristol and State of Massachusetts, have invented a new and useful Improvement in Locomotive-Engines; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, letters, figures, and references thereof.

Of these drawings Figure 1, denotes a vertical, central and transverse section of the front portion of a locomotive steam carriage with my invention applied thereto, the said section being taken in plane of a line C, D, Fig. 5, to be hereinafter described. Fig. 2, is a front elevation of the same as it appears without its air deflector or trumpet mouth. Fig. 3, is a vertical and transverse section taken through the steam blast pipes or on the line, A, B, of Fig. 1, the same being made so as to exhibit the parts on the right of such line. Fig. 4, is a similar section, but constructed so as to represent the parts on the left of such line A, B. Fig. 5, is a horizontal section taken on the line, E, F, of Figs. 1, 2, and 3, such exhibiting by dotted lines the partition between the air passage and the smoke box. Fig. 6, is a top view of the air passage damper or valve. Fig. 7, is a rear view of the deflector and its system of valves and air openings. Fig. 8, is a transverse section of the same taken on the line G, H of Fig. 7, the middle or central valves being represented as closed while the outer valves are shown as open. Fig. 9, is a similar section in which the central valves are denoted as open and the others as closed.

In most locomotive engines, or steam carriages the draft is accelerated by permitting the waste steam to escape into the chimney through blast pipes, their upper ends or mouths being generally contracted in order to compress the steam and prolong the time of its emission. The production of steam by the boiler is consequently increased; but the pressure of that arrested for the purpose of creating draft acts, as it were contrary to the movement of the piston and tends to diminish the motive power. This loss of power becomes very considerable at high velocities. Under ordinary circumstances, the contraction of the mouth of the blast pipes creates a loss of power of thirty-five to forty per cent. of the actual power of the steam. I have therefore sought to apply to the locomotive engine some contrivance, which while it would enable me to dispense with the contraction of the mouth of the blast pipes would improve the draft sufficiently for all practical purposes.

In carrying out my invention, I provide the chimney, with a secondary chimney, K, which is arranged therein as seen in Figs. 1, 3, 4, and 5, and I surround the same by an air passage, M, M, which is made to communicate with an opening or passage L, formed through the front end of the engine. The air passage or chamber M, M, lies between the main chimney and the said secondary chimney, but not only has no communication with the main chimney except at the top of the secondary chimney, but when in use has none with the smoke box.

The blast pipes are shown at, N, N, in the drawings as leading into the smoke box O, which communicates with the fireplace by pipes P, P, extending through the boiler in the ordinary way.

The opening or passage L, before named I provide with butterfly valves as seen at S, S, in Figs. 1, 7, 8, and 9, and I also furnish said passage with a trumpet mouth or deflector, T, so formed as to cause the air against which its front surface impinges while the engine is running on the railway to pass toward and into the opening, L, provided the valves thereof be not closed. The diameter of this deflector, T, is made somewhat greater than that of the smoke box O, the deflector being, near its periphery, carried backward as seen at *a*, *a'*—the rearward curve of it constituting what may be termed a "reverse deflector," its purpose, when the engine is run backward being to deflect air into other openings, U, U, arranged around the opening L, as seen in Figs. 1, 7 and 8, the said openings U, U, being made through the front head of the engine and so as to lead the deflected air into the passage, M, M. To the said openings, U, U, an annular valve plate, V, is applied, it being so formed as to enable as either to close them or uncover them as occasion may require. The said annular valve plate is so connected with the butterfly valves S, S, by means of rods or links, W, W, jointed both to it and the valve, that when it is turned in one direction or so as

to close its valves it shall open the butterfly valves, and when turned so as to open its valves, it shall close the butterfly valves.

For convenience of obtaining access to the smoke box, the front of the part K may be provided with an opening and closing port or man hole plate as seen at X, see Figs. 1 and 2, and the whole front head, Y, of the engine may be applied to the body of it by means of a hinge as seen at Z, such enabling such end together with the deflector I to be turned around so as to have the whole front of the passage, M, entirely open. The upper part of said passage, M, I provide with an annular valve formed as seen at C, in Figs. 1, 3, 4 and 6. This valve when depressed contracts the discharging mouth of the passage, M, and the current of air which rushes out of, the same and over the top of the secondary chimney, K. By so contracting the said tubular column of air passing out of the passage, M, the draft up the chimney K, will be materially promoted. The conical passage through the valve serves to produce such contraction of the air. The stem of the valve carries a toothed rack *d*, which works in a pinion *e*, fixed upon a shaft *f*. By rotating the said shaft, the valve may be either raised or lowered at pleasure.

By means of my invention, I am enabled to employ steam blast tubes N, N, without contracted mouths of discharge, the steam carriage while either going forward or backward being made to operate its air draft apparatus so as to produce sufficient draft to keep up the necessary supply of steam. I am also able to accomplish this with a great saving of fuel in comparison with what is consumed when the blast tubes are constructed with contracted mouths of discharge.

I do not claim combining with a chimney a tube for receiving a current of air and injecting it into the chimney in order to improve its draft. Nor do I claim so combining a steam eduction pipe with the chimney of a locomotive steam carriage that the steam proceeding from the pipe may be caused to flow or rush into and up the chimney so as to improve its draft. Nor do I claim combining with the furnace or fireplace of a locomotive steam engine an air blast apparatus. Nor do I claim merely arranging on the front of the chimney or flue of a locomotive steam carriage a funnel or mouth for introducing air into the flue or chimney and increasing its draft, when the carriage is in motion so as to carry the funnel or mouth against the air; but

What I do claim is—

1. Combining with an air receiving mouth L arranged on the front end of the locomotive steam carriage the chimney, I, and smoke box, O, a secondary chimney, K, and a concentric or surrounding air passage, M, whereby, when the steam carriage is in movement on the railway, a current of air may be caused to rush into the chimney and around and above the mouth of the secondary chimney and so as to aid in increasing the draft through the smoke tubes as specified.

2. And in combination with the air deflector, T, the air passage, L, I claim one or more closing valves or doors to the former, a covered deflector, *a*, and one or more other mouths or openings, U, U, and a closing contrivance or annular valve V, the same being so applied as to enable the engine either in moving forward or backward to cause a current of air to enter its chimney in manner and for the purpose as specified.

3. I also claim the manner in which the valve, *c*, is made and applied to the passage, M, and the secondary chimney K, in order that it may not only serve to diminish the discharging mouth of said passage, but deflect or contract the tubular current of air passing out of it, and so as to improve the draft as stated.

In testimony whereof, I have hereunto set my signature this thirty first day of March A. D. 1855.

CHAS. F. THOMAS.

Witnesses:

R. H. Eddy,

F. P. Hale, Jr.