

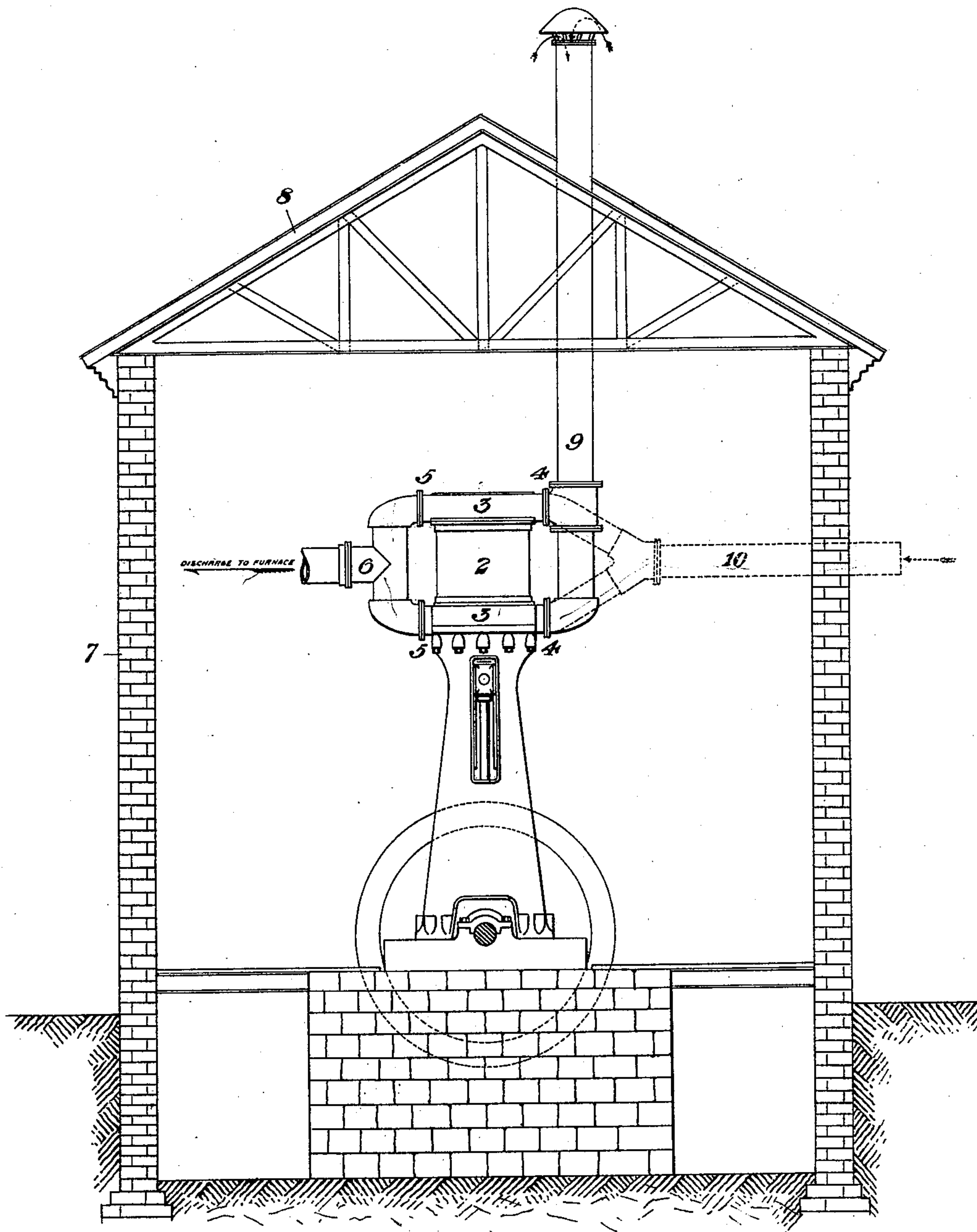
(No Model.)

J. GAYLEY.

APPARATUS FOR SUPPLYING AIR TO BLAST FURNACES AND CONVERTERS.

No. 594,243.

Patented Nov. 23, 1897.



WITNESSES

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UNITED STATES PATENT OFFICE.

JAMES GAYLEY, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR SUPPLYING AIR TO BLAST-FURNACES AND CONVERTERS.

SPECIFICATION forming part of Letters Patent No. 594,243, dated November 23, 1897.

Application filed March 26, 1896. Serial No. 584,938. (No model.)

To all whom it may concern:

Be it known that I, JAMES GAYLEY, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Supplying Air to Blast-Furnaces and Converters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, which shows in side elevation, partly in vertical section, apparatus constructed in accordance with my invention.

My invention has relation to an improvement in means for supplying air to blast-furnaces and steel-converters. In such metallurgical operations as the smelting of iron ore in blast-furnaces or the refining of steel in converters it is of utmost importance that the air supplied to the furnace or converter should be as dry as possible, for any moisture which is carried in by the blast is dissipated only at the expense of heat, and this of course is very wasteful. I have discovered that a very material saving can be effected in this regard by taking the air-supply for the blowing-engines not from the room in which the engines are stationed, as has been common practice heretofore, but from the outside of the building, for I have found by careful observation of hygrometers that the outside air is much dryer than the air within, which, because of higher temperature and of the escape of steam from joints of pipes, &c., will contain a considerable proportion of moisture. As an illustration of this, I will state that the average readings of hygrometers within the engine-room and in the external air for one month were as follows: inside engine-room, 8.9 grains of moisture per cubic foot of air; outdoors, 4.8 grains of moisture per cubic foot of air. This difference is very important, for with the amount of air usually supplied per minute by blast-engines one grain of moisture per cubic foot of air represents the supplying of twenty-five gallons of water per hour to the furnace or converter, and in the instance cited above if the air were taken by the blowing-engine from the engine-room, containing 8.9 grains of moisture per cubic foot, the engine would force into the furnace or converter with the air two hundred and twenty-two and

one-half gallons of water per hour, while if the air were taken from outdoors, containing, as stated, 4.8 grains of moisture per cubic foot, only one hundred and ten gallons of water would be delivered. The derangement of the operation of the furnace caused by the excess of moisture in the case of air taken from the engine-room would be very considerable.

The apparatus I have devised is constructed as shown in the drawing, and is as follows:

The drawing shows an air-blowing engine, which may be of any suitable type.

2 is the air-cylinder; 3 3, the air-boxes.

4 4 are the air-inlet passages, and 5 5 the air-discharge passages which, through a blast-pipe 6, lead to a converter or to a stove in which the air is heated before delivery to the blast-furnace.

7 represents the walls, and 8 the roof, of the engine-house.

Instead of arranging the openings of the air-inlet passage in the engine-room, as has been common practice heretofore, I connect said openings with the external air by a suitable supply-pipe which preferably leads through the roof, as at 9, so as to draw the air from a level well above the ground; but it may lead horizontally through one of the walls, as at 10. It is desirable to make the pipe with as few bends as possible, so as to reduce the frictional resistance to the passage of the air. This and the direction in which the pipe extends to the exterior of the building are not, however, limiting features of my invention.

The advantages of my invention in respect of its simplicity and the improvement in the conduct of furnaces which it affords will be appreciated by those skilled in the art.

The fact that the air in the engine-room of blowing-engines is substantially more humid than air taken from the atmosphere outside the building and that there is any advantage to be derived from taking the air from outside was not known prior to my invention. Blowing-engines have been universally arranged to take their air immediately at the location of the engine in the engine-room, where they derive air containing a large percentage of moisture, by reason of the warmth of the air,

increased above that out of doors by contact with the steam-cylinder and compressed-air pipe, which facilitates the absorption of steam that escapes from the steam-pipes, very
5 often in small and invisible jets, and also the moisture in the wheel-pits. An increase in the temperature of the atmosphere does not produce the same effect on the air outside as on that inside of the engine-room, since this
10 increase only causes the outside air to retain its units of moisture more tenaciously, while the inside air in addition absorbs through its increased capacity an increased amount of moisture which is supplied from the leaking
15 of steam, and likewise when the temperature falls the inside air parts with less moisture, thus requiring an additional quantity of fuel

to dissipate a large amount of moisture, which my invention avoids.

I claim—

The combination with a blast-furnace or converter, of an air-blowing engine which supplies air thereto and is inclosed in a building, and a pipe or conduit leading from a point outside the building to the air-inlet of said
20 engine, whereby the air delivered to the furnace or converter is taken from the external atmosphere; substantially as described. 25

In testimony whereof I have hereunto set my hand.

JAMES GAYLEY.

Witnesses:

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