

(No Model.)

H. S. ROBINSON.
APPARATUS FOR FORCING AIR.

No. 455,359.

Patented July 7, 1891.

FIG. 1.

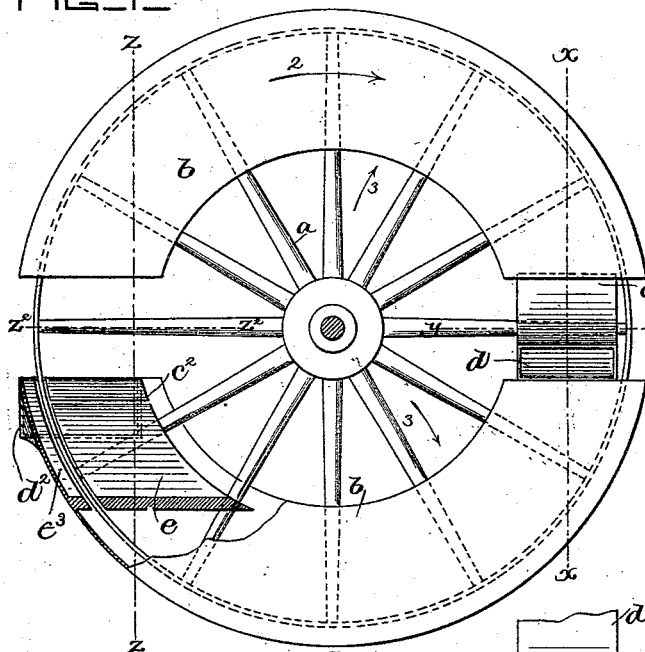


FIG. 2.

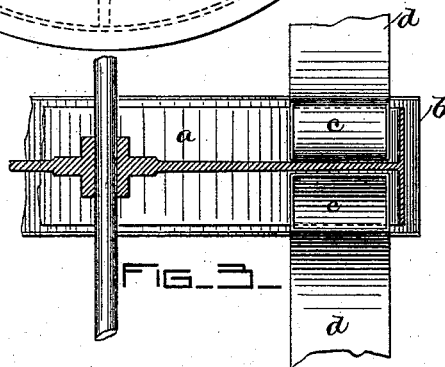
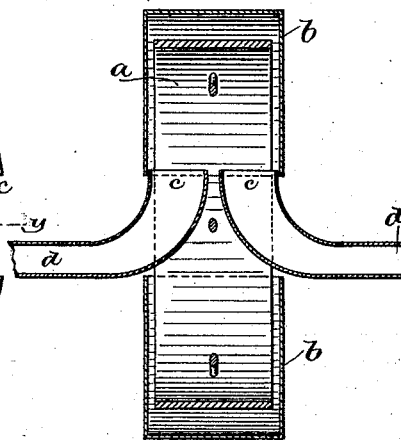


FIG. 3.

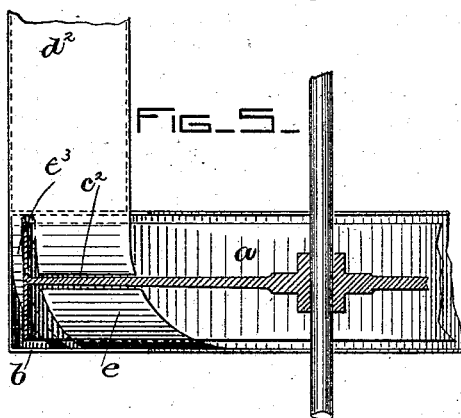
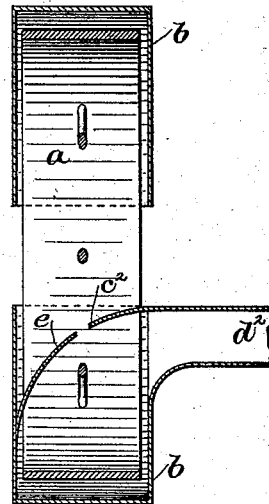


FIG. 4.

FIG. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY S. ROBINSON, OF ANDOVER, MASSACHUSETTS.

APPARATUS FOR FORCING AIR.

SPECIFICATION forming part of Letters Patent No. 455,359, dated July 7, 1891.

Application filed July 24, 1890. Serial No. 359,806. (No model.)

To all whom it may concern:

Be it known that I, HENRY S. ROBINSON, of Andover, county of Essex, State of Massachusetts, have invented an Improvement in Apparatus for Forcing Air, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

10 The object of my invention is to provide means for utilizing the disturbance of the air produced by the fly-wheels of steam-engines for the purpose of creating air currents or blasts, which may be utilized in any suitable
15 or usual manner, either for the purpose of ventilation, for providing a forced draft for furnaces, for exhausting or removing vitiated air from apartments, or for forcing currents of air to be heated and then employed for
20 heating buildings or for drying or other similar purposes. The motion of the fly-wheel or belt-pulley of a steam-engine tends to cause a disturbance in the air, throwing the same outward by centrifugal force from the
25 hub toward the periphery of the wheel; but such movement cannot be availed of as in ordinary centrifugal blowers, for the reason that the continuous periphery of the wheel or pulley tends to confine the air and does
30 not afford a tangential path of escape, by which the air thrown outward from the hub toward the periphery can be received in suitable ducts outside of the periphery of the wheel. I have discovered that by combining
35 with a fly-wheel suitable deflectors or guides the air which is thrown outward and carried around with the wheel may be directed into suitable ducts, affording a strong blast, which may be utilized for various purposes without
40 causing the expenditure of any considerable amount of additional power by the fly-wheel, so that considerable saving is effected whenever it is desired to use an air-blast in establishments provided with an engine.

45 The invention consists, mainly, in the combination, with a fly-wheel, of deflectors located between the periphery and the axis of the wheel and extended as close as possible to the inner surface of the wheel-rim and to
50 the sides of its spokes and substantially tangential thereto, the said deflectors gradually curving from their tangential position and

being located at the terminals of ducts or blast-pipes, so that the air carried by the wheel and moving mainly in a tangential direction with greatest force and velocity near the outer end of the spokes, strikes upon said
55 deflectors and is carried away by them from the wheel and into the air-ducts, the said deflectors acting, as it were, to skim or scoop the air off from the portion of the wheel by
60 which it is carried. In some cases it may be desirable to have such deflectors, or "skim-mers," as they may be called, one at each side of the plane of revolution of the wheel; but when it is necessary or desirable to have
65 the air carried away from one side of the wheel only a deflector may be employed at the other side which curves inward toward the plane of revolution of the wheel, and thus
70 tends to throw the air transversely to the other side of the wheel, where a skimming deflector takes the air that has thus been thrown across from the other side of the
75 wheel, as well as that from the adjacent side of the wheel, and directs it all into the air-duct or blast-pipe.

Figure 1 is a side elevation of an air-forcing apparatus embodying this invention, the fly-wheel being shown as having two sets of
80 air-collecting devices, one arranged to take the air from both sides or faces of the wheel and the other arranged to throw the air from one to the other side of the wheel and to take the air from the side to which it is thus thrown.
85 Fig. 2 is a partial section on line *x*, Fig. 1; Fig. 3, a sectional view on line *y*, Fig. 1; and Figs. 4 and 5, sectional details on line *z* and *z'*, respectively, Fig. 1.

The invention may be employed in connection with an engine fly-wheel *a*, of any suitable or usual construction; and it consists in the combination, with said wheel, of certain
90 air deflecting and conducting devices to be described, by which the air which is set in movement by the fly-wheel is caused to produce a definite current or blast of air in a
95 suitable duct or blast-pipe, instead of merely producing irregular and useless air-currents, as is commonly done by the fly-wheel of an engine. A portion of the periphery of the
100 wheel is inclosed in a casing *b*, which may be of usual construction, and the direction or motion of the wheel is indicated by the arrow

2, such motion causing outward currents of air from the hub toward the periphery, as indicated by arrows 3, while at the inside of the rim and near the periphery the air is of some-
 5 what greater density than that of the atmosphere, and is carried with considerable velocity in the direction of motion of the wheel itself.

Fly-wheels as commonly constructed for
 10 engines of large size have sufficient unevenness or irregularity in the periphery to cause a considerable disturbance of the air, they engaging the air by the projections formed at the junctions of the spokes with the rim, by
 15 the spokes themselves, and by the junction between different sections of the rim when the wheel is made in sections bolted together and otherwise, so that it will not usually be necessary to change existing wheels at all in order
 20 to utilize them in connection with the air-ducts and collecting device in accordance with this invention, although it is obvious that the engaging portions of the wheel may be increased, if necessary, when it is desired
 25 to utilize the air-currents produced by the motion of the wheel in accordance with the present invention.

At suitable points near the outer ends of the spokes and near the rim or periphery of
 30 the wheel suitable deflectors c are employed, said deflectors being formed at the end and constituting the mouth of a blast-pipe or air-duct d , and so shaped that their end portions are substantially tangential with the path of
 35 rotation of the outer ends of the spokes, so that the air carried by the spokes and within the periphery of the wheel naturally strikes upon the said deflectors and is directed away from the wheel and into the air-ducts, producing the desired blast in said ducts. As
 40 shown at the right hand of Fig. 1 and in Figs. 2 and 3, there are two of said ducts, terminating in deflecting mouth-pieces or inlet-openings, within but near the periphery of the
 45 wheel and one at each side of the spokes thereof, thus making two independent air-passages, one taking the air from each side of the wheel, which passages or ducts may, however, if desired, be brought into one in
 50 case a single current of air is used. When, however, it is not convenient to take the air from both sides of the wheel independently, the construction shown at the left hand of
 Fig. 1 and in Figs. 4 and 5 may be employed,
 55 the same comprising a deflector c^2 and air-duct d^2 at one side of the wheel, which may be substantially like the deflector c and duct d , before described, except that the portion of the deflector extending toward the spokes
 60 makes a greater angle with their path of movement or does not come quite to the tangential position. On the other side of the wheel and the inside of the casing a deflector e is employed, extending from the inner wall of
 65 the casing inward toward the spokes of the wheel, so that the air carried around in the said casing is crowded over the wall of the

casing toward the spokes of the wheel, and passes across through the spaces between the spokes of the wheel to the other side and
 70 enters the mouth c^2 of the duct d^2 , which mouth acts with a scooping action upon the air at the same side of the wheel with it while receiving the current of air, which is forced over from the other side of the wheel
 75 through the spaces between the spokes, as before described. In this manner the air disturbed by the wheel, instead of making local currents or being thrown off from the part near the periphery of the wheel wherever it
 80 meets an obstruction—as, for example, where the wheel passes through the floor—and again drawn in near the center of the wheel and carried outward toward the periphery of the
 wheel by centrifugal force, is caused to make
 85 a steady current, having a slight exhausting or rarefying action near the hub of the wheel and a slight condensing action near the periphery of the wheel, producing a steady pressure, by which a continuous steady current or
 90 blast is maintained in the blast-pipe.

It is obvious that the shaping of the ducts and deflectors by which the air is taken off from the wheel and directed into said ducts
 95 may be varied considerably without departing from the essential features of construction and mode of operation of the invention herein described, and will depend largely upon existing conditions of the wheel and adjacent
 100 parts.

It is not essential for the operation of the apparatus herein described that the wheel should be incased, although the casing contributes to the efficiency and may be made
 105 more effective by extending it farther inward toward the hub of the wheel, as shown, than is usually done.

If desired, a deflector e^3 (see Figs. 1 and 5) may be employed at the outside of the rim of the wheel in addition to those at the inside
 110 of the rim, such deflector being shown in this instance as crossing the space between the wheel-rim and inside of the casing and constituting, practically, a continuation of the surface e c^2 , as shown in Fig. 5. In other
 115 words, the surfaces e , e^3 , and c^2 (shown at the left hand in Fig. 1 and in Fig. 5) practically constitute a single curved deflector having openings in it to accommodate the passage of the wheel rim and spokes.

I claim—

1. An air-forcing apparatus comprising a wheel having a continuous periphery or rim, as the fly-wheel of a steam-engine, said rim constituting the main air-propelling part, com-
 120 bined with air-ducts and deflecting mouth-pieces therefor, extending into proximity to said rim for the purpose of removing the air from the wheel and directing it into said ducts, substantially as described.

2. The combination of a wheel having a rim and spokes, which constitute an air-propeller, with an inwardly-curved deflector at one side
 130 of said wheel, curving toward the middle plane

of said wheel, and an air-duct having an open mouth with deflecting-walls at the other side of said wheel, substantially as and for the purpose described.

- 5 3. The combination of a fly-wheel having a continuous periphery or rim with an air-duct and a deflecting mouth-piece for said duct, extending toward the said wheel between the rim and the axis of rotation of the wheel and
10 terminating in a position substantially tan-

gential to the wheel, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY S. ROBINSON.

Witnesses:

JOS. P. LIVERMORE,
M. E. HILL.