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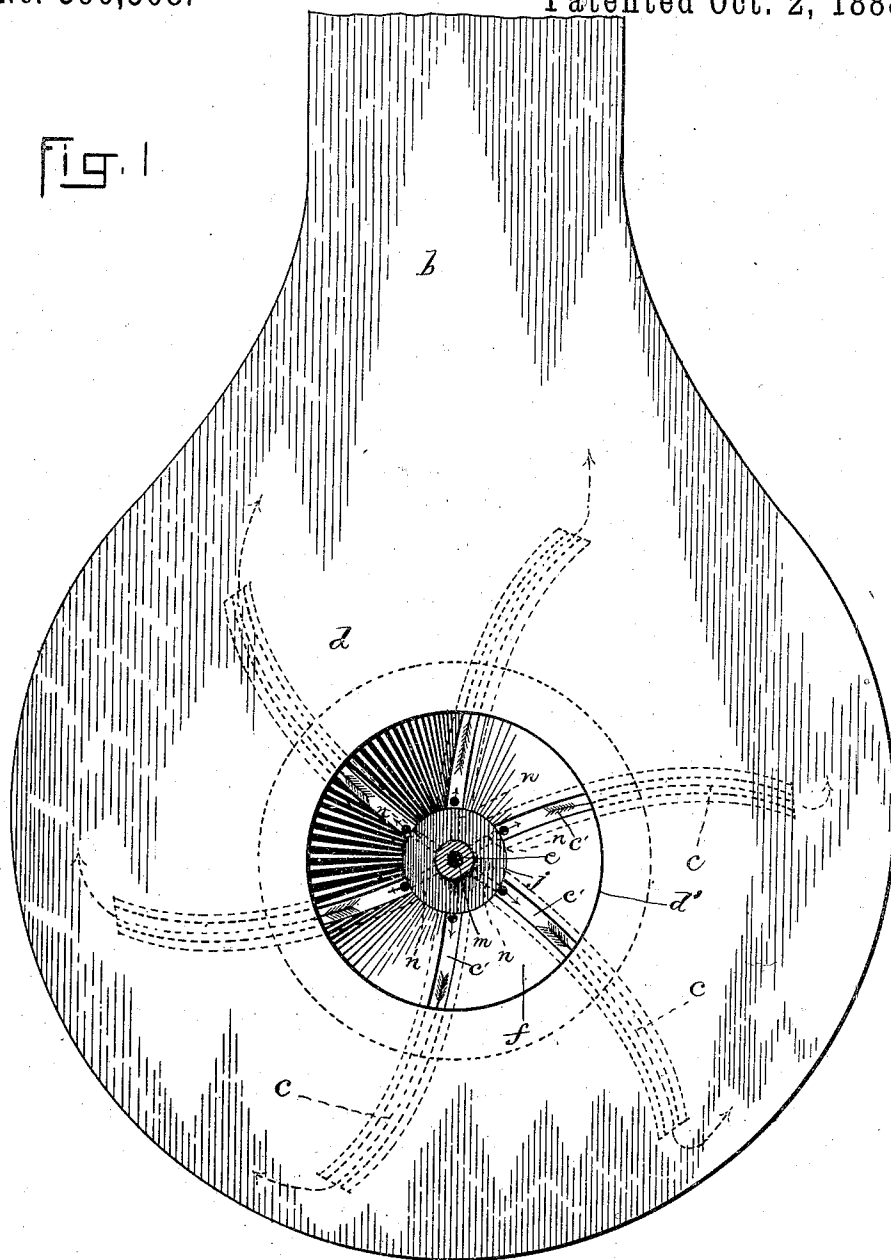
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C. D. MOSHER & G. W. BROWN.

DRAFT APPLIANCE FOR STEAM BOILER FURNACES.

No. 390,508.

Patented Oct. 2, 1888.



WITNESSES.

H. Brown.
A. D. Harrison.

INVENTOR.

C. D. Mosher

G. W. Brown

by Wright Brown Conley
Atty

(No Model.)

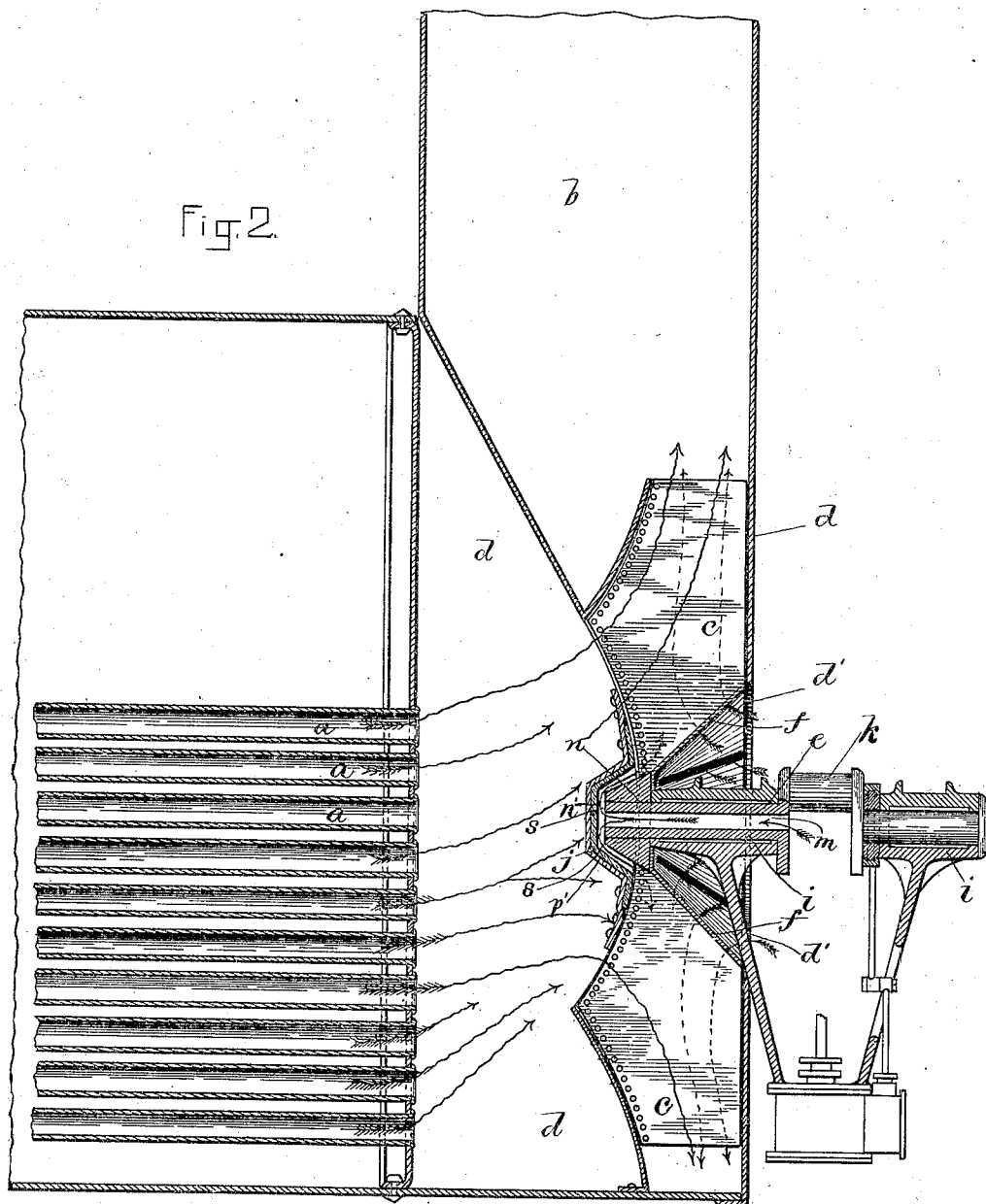
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C. D. MOSHER & G. W. BROWN.

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WITNESSES.

H. Brown,
A. D. Hammon

INVENTOR.

C. D. Mosher

G. W. Brown

by Knight Brown & Corralley
Attys

(No Model.)

3 Sheets—Sheet 3.

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Fig. 3.

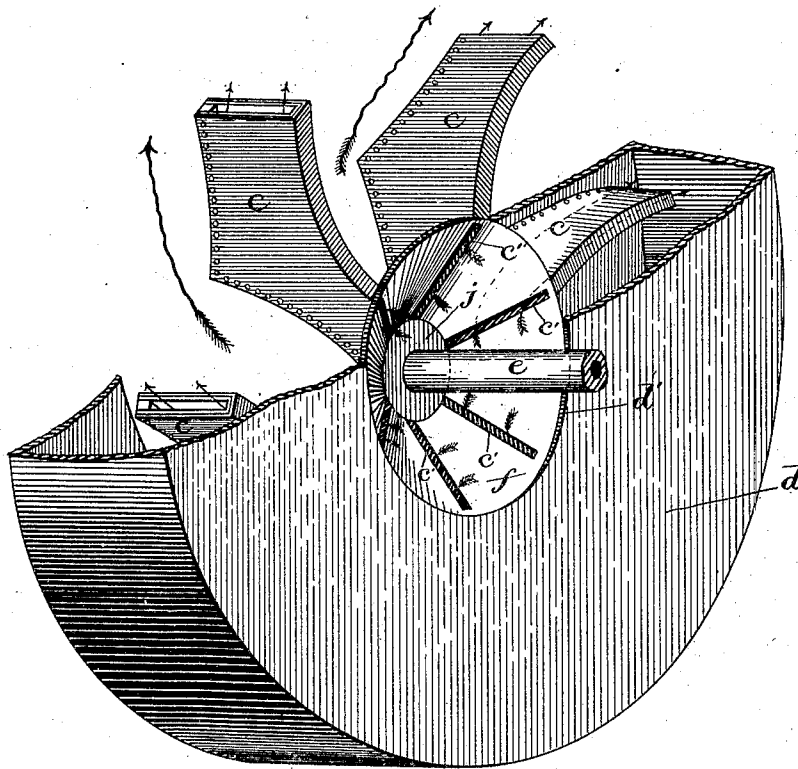
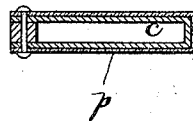


Fig. 4.



WITNESSES.
H. Brown.
A. B. Hammon.

INVENTOR.
C. D. Mosher
G. W. Brown
by Hight, Brown & Connelley
Attys

UNITED STATES PATENT OFFICE.

CHARLES D. MOSHER, OF AMESBURY, AND GILMAN W. BROWN, OF WEST
NEWBURY, MASSACHUSETTS.

DRAFT APPLIANCE FOR STEAM-BOILER FURNACES.

SPECIFICATION forming part of Letters Patent No. 390,502, dated October 2, 1888.

Application filed February 29, 1888. Serial No. 265,663. (No model.)

To all whom it may concern:

Be it known that we, CHARLES D. MOSHER and GILMAN W. BROWN, residents, respectively, of Amesbury and of West Newbury, both in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Draft Appliances for Steam-Boiler Furnaces, of which the following is a specification.

This invention has for its object to provide simple and effective means for creating draft through the furnaces of marine and other boilers; and it consists, first, in a rotary fan or blower located at a suitable point in the flue or passage through which the products of combustion pass from a furnace, said blower having hollow blades formed to permit the continuous passage of air, the arrangement being such that cool external air is admitted to and passes through said blades, which are thereby protected from the intense heat to which they are subjected.

The invention also consists in certain details of construction, all of which we will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a front elevation of a portion of the flue or passage between the furnace and smoke-stack of a steam-boiler. Fig. 2 represents a section on line *x x*, Fig. 1. Fig. 3 represents a perspective view of a portion of an improved fan and a portion of the flue casing. Fig. 4 represents a sectional view of one of the fan-blades.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a a* represent the tubes through which the products of combustion are conducted through a steam-boiler from the furnace to the stack *b* of a steam-boiler. In the casing *d*, connecting said tubes and stack, we place a rotary fan, the blades *c c* of which are hollow, their inner ends opening to the external air through slots *c'* in a frusto-conical diaphragm, *f*, which is attached to the bases of the blades and to the shaft *e*, which rotates the fan. The outer ends of said blades open into the casing *d*, so that outside air passing through the blades mingles in said casing with the products of combustion in said casing and

passes to the stack. The outer side of the casing *d* has an opening, *d'*, the margin of which is in the closest possible proximity to the outer edge of the diaphragm *f*, so as to prevent as fully as possible the admission of outside air into the casing around said diaphragm without being in contact with said diaphragm, which, of course, rotates with the fan and prevents outside air from passing into the casing *d* between the fans.

The shaft *e*, which rotates the fan, is journaled in bearings *i i*, one of which projects into the diaphragm *f* and supports said shaft close to the hub or spider *j*, to which the blades *c* are attached. Said shaft may be rotated by any suitable means, and is here shown as provided with a crank, *k*, adapted to be connected with an engine of any suitable type. The shaft *e* has a longitudinal passage, *m*, which is open at one end to the outside air and communicates with an air-space, *s*, between the inner side of the hub *n* and a cap, *n'*, attached to the blades *c*. The air-space *s* communicates with the air-passages in the fans through openings in the bases of the fans. Air is thus caused to pass continually through the hub of the fan to protect said hub from the heat to which it is subjected.

We prefer to cover the blades with asbestos paper, *p*, or other suitable non conductor of heat, suitably secured to said blades, as a means for additionally protecting the blades from the heated products of combustion. The exposed surface of the cap *n'* may also be protected by asbestos paper, *p'*, as shown in Fig. 2.

It will be seen that the rotation of the fan creates a draft in the casing *d*, while the constant passage of cool air through the blades of the fan prevents said blades from being injured by the heat. Our improvement therefore makes the use of a fan practicable as a means for forcing a draft, and furnishes a simple and comparatively inexpensive substitute for the complicated, expensive, and dangerous forced-draft systems now in use.

It is obvious that the form and arrangement of the fan and its diaphragm *f* may be variously modified without departing from the spirit of our invention.

We do not limit ourselves to a fan arranged

in close proximity to an opening in the flue-casing and provided with a diaphragm, as shown, for the fan may in some cases be placed within the flue or stack at a distance from the casing and receive air into its blades through the hollow shaft which rotates the fan.

We claim—

1. The combination, with a flue or conduit for the products of combustion from a boiler-furnace, of a rotary fan within said flue having hollow blades, and connections between said blades and the atmosphere outside of the flue, whereby cool air is enabled to pass through the blades, as set forth.

2. The combination, with a flue or conduit for the products of combustion from a boiler-furnace, of a rotary fan within said flue having hollow blades, connections between said blades and the atmosphere outside of the flue, whereby cool air is enabled to pass through the blades, a shaft supporting said fan, and a motor connected with said shaft outside of the flue, whereby the shaft and fan are rotated, as set forth.

3. The combination, with a flue or conduit for the products of combustion from a boiler-furnace, of a rotary fan within said flue having hollow blades, connections between said

blades and the atmosphere outside of the flue, whereby cool air is enabled to pass through the blades, a crank-shaft supporting said fan, and an engine connected directly with the crank of said shaft outside of the flue, as set forth.

4. A rotary fan having hollow blades containing air-passages, and a diaphragm secured to the fan as a means for preventing air from passing between the blades, said diaphragm having openings for the admission of air to said air-passages, as set forth.

5. A rotary fan having hollow blades containing air-passages, and a diaphragm arranged to prevent air from passing between the blades, said diaphragm having openings for the admission of air into the blades, combined with a casing having an opening coinciding with said diaphragm, as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 23d day of February, A. D. 1888.

CHARLES D. MOSHER.
GILMAN W. BROWN.

Witnesses:

C. F. BROWN,
A. D. HARRISON.