

G. F. HURT.
EXHAUSTER.
APPLICATION FILED JUNE 12, 1919.

1,323,533.

Patented Dec. 2, 1919

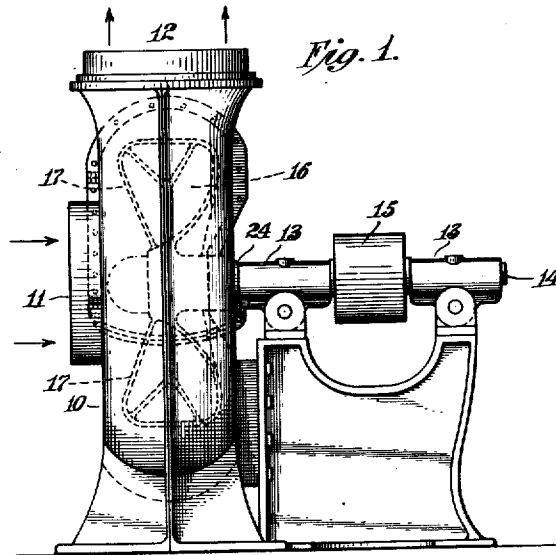


Fig. 1.

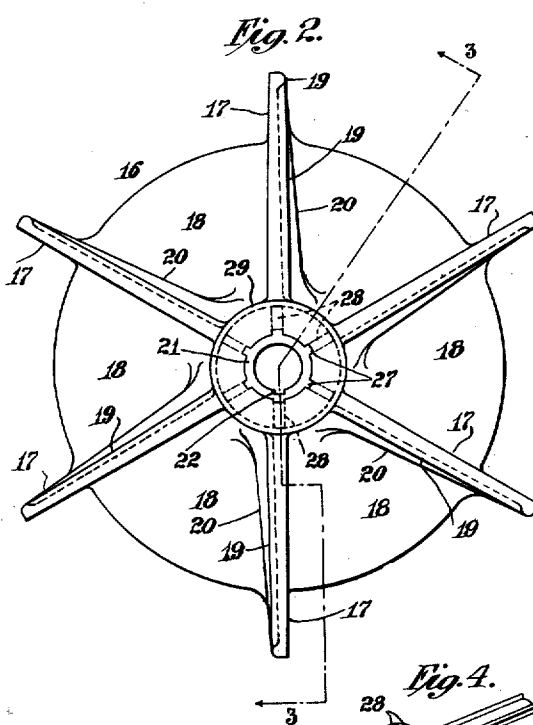


Fig. 2.

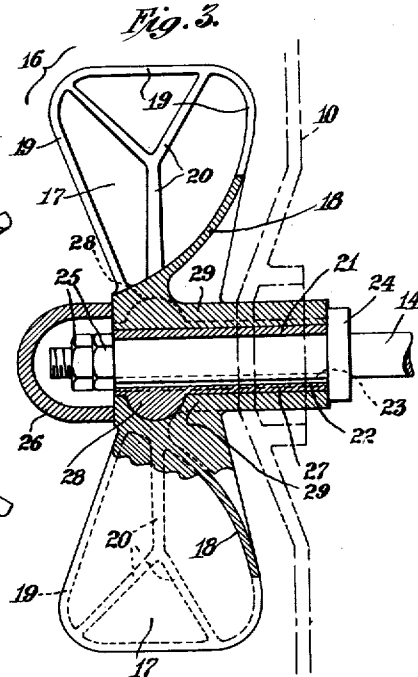


Fig. 3.

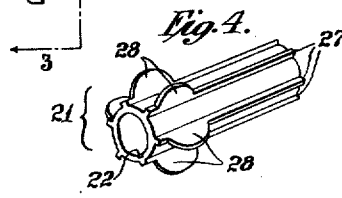


Fig. 4.

INVENTOR,
George F. Hurt
BY
Rogers, Kamsdy & Campbell,
ATTORNEYS.

UNITED STATES PATENT OFFICE.

GEORGE F. HURT, OF ATLANTA, GEORGIA, ASSIGNOR TO PRATT ENGINEERING & MACHINE COMPANY, OF ATLANTA, GEORGIA, A CORPORATION OF GEORGIA.

EXHAUSTER.

1,323,533.

Specification of Letters Patent.

Patented Dec. 2, 1919.

Application filed June 12, 1919. Serial No. 303,543.

To all whom it may concern:

Be it known that I, GEORGE F. HURT, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Exhausters, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention is a novel exhauster, the inventive features relating more particularly to the structure of a centrifugal exhauster or fan, or the blast wheel thereof, adapted for exhausting or propelling corrosive gases or fluids. A typical instance of the use of such exhauster is to draw the gases from the upper part of the Glover tower of a sulfuric acid plant and propel it into the first acid chamber of the plant, for example, as shown in my copending application Serial No. 295,943, filed May 9, 1919. The present invention is shown as applied to an exhauster of the general type disclosed in prior patent of N. P. Pratt, 602,770, patented April 19, 1898.

An object of the present invention is to afford an exhauster simple and inexpensive of construction, yet efficient and durable in use, the last mentioned quality depending chiefly on the protection against corrosion and the provision against distortion. It is important in apparatuses of this kind to prevent the gases being exhausted from coming into contact with corrosible metal. The best non-corrosible metals, of which regulus metal is typical, are relatively soft and easily deformable, the mentioned metal, for example, softening at a temperature of 100° C., sufficiently to materially deform at the high speed required. The temperature of the gases passing from the Glover tower is high.

The deformation takes effect by a bending and distortion of the blades or vanes of the blast wheel, and this is minimized or overcome herein by the provision to be described, of affording increased stiffness of structure; and the mode of securing to the driving shaft the non-deformable blast wheel is likewise herein improved. By reason of these described features of improvement, the advantage is gained that an increased suction or pressure of the gas is developed, resulting in a material increase in the amount of gas delivered per unit of time.

To the attainment of the above referred to objects and advantages, the present invention consists in the novel exhauster and blast wheel herein illustrated or described, and the novel features of combination, arrangement, structure and detail thereof.

In the accompanying drawings illustrating one form or embodiment of the present invention, Figure 1 is a side elevation of an exhauster of the general type disclosed in said prior patent, but improved by the addition of the features constituting the present invention.

Fig. 2 is a left side view of the blast wheel detached.

Fig. 3 is a section of the same, taken on the irregular line 3—3 of Fig. 2.

Fig. 4 is a perspective view of the interior portion, stiffening or core which is embedded in the blast wheel and serves also as a bushing or lining.

The casing 10 may take different forms. It may be as in said prior patent, having a removable portion permitting the insertion and removal of the blast wheel. The casing is shown as having an inlet or entry flue 11, centrally or axially arranged, and an outlet or discharge flue 12 located tangentially on the periphery of the casing 10. In external bearings 13 runs the shaft 14, driven by pulley 15 and carrying at its internal end the blast wheel 16. It will be noted that the innermost bearing is as close as possible to the wheel, so as to give smooth running qualities, and there is no bearing at the opposite or inlet side of the casing.

The blast wheel 16 is shown as having a plurality of vanes or blades. Six of these are shown, and they may be radially arranged, as seen in Fig. 2. These blades are formed of regulus metal. They are connected and stiffened by a curved or bell-shaped web 18, springing from the hub portion 29 in the manner shown in Fig. 3. This not merely connects and stiffens the blades, but facilitates the diverting of the axially entering gases to a centrifugal or radially outward direction. Each blade is further stiffened against distortion by being formed with a peripheral rib 19 around its outline and interior ribs 20, shown in the shape of the letter Y.

Each blade is thus rendered stiffer against distortion, but the presence of the ribs for this purpose increases the weight of each

blade, and therefore the tendency to distort about the neck of the blade, that is, the point at which it springs out from the hub. Such distortion is herein prevented by an
5 embedded stiff metal part or core having longitudinal fins rigid relatively to the shaft and extending outwardly to stiffen the neck portion of each of the blades. Such improvement, therefore, permits the blades
10 themselves to be stiffened by the ribs, as described, and a blast wheel is provided which attains the advantage before mentioned, of non-deformability, while preserving its non-corrosive character.

15 The rigid or stiff metallic portion or core 21 is shown separately in Fig. 4, and is indicated in Figs. 2 and 3. This is preferably composed of bronze, and it is shown as having a longitudinal keyway 22, by which it
20 can be keyed to the shaft, the latter having a corresponding keyway 23. The bronze member 21, it will be understood, is a unitary part of the blast wheel 16, being embedded in and protected by the soft metal,
25 preferably in the process of forming or casting the latter. The bronze portion 21, as stated, forms the bushing by which the blast wheel is connected to the shaft 14, and it is held against longitudinal movement by
30 a collar 24, formed on the shaft, and a pair of nuts 25 at the threaded extremity of the shaft. As these parts, the shaft, the bronze portion and the nuts are corrosible, a non-corrosible cap 26 is preferably soldered or
35 otherwise secured in place, as indicated in Fig. 3.

The bronze core member 21 is shown as provided with longitudinal fins 27, which stand out radially, and each of these, near
40 the point of the neck of each of the blades, is formed with an outstanding stiffening flange or extension 28, which, as seen in Fig. 3, enters into the body of the soft metal at the neck of each blade. Each fin extension is thereby in stiffening relation to its
45 blade. The hub 29 of the blast wheel, composed of the soft metal, completely embeds

the bronze member 21, so that the latter is wholly protected against corrosive action.

It will thus be seen that I have thus de- 50 scribed an exhauster and a blast wheel therefor embodying the principles and attaining the objects and advantages of the present invention. Since many matters of arrangement, combination, form and detail may be 55 modified without departing from the principles, it is not intended to limit the present invention to such features except so far as set forth in the appended claims.

What is claimed is:

60 1. In or for a centrifugal exhauster for corrosive fluids, a metallic blast wheel rotatably driven within a suitable casing by a shaft, the same comprising soft metal blades and hub, and a web connecting and stiffen- 65 ing said blades and each blade formed with stiffening rib at its outline.

2. In or for a centrifugal exhauster for corrosive fluids, a metallic blast wheel rotatably driven within a suitable casing by a 70 shaft, the same comprising soft metal blades and hub, and a stiff metal core having longitudinal fins, each extended outwardly into stiffening relation to one of said blades.

3. The exhauster as in claim 2 and where- 75 in each blade is formed with a stiffening rib at its outline.

4. The exhauster as in claim 2 and where- in each blade is formed with a stiffening 80 rib at its outline and a Y-shape rib at its side.

5. In or for a centrifugal exhauster for corrosive fluids, a metallic blast wheel rotatably driven within a suitable casing by a 85 shaft, the same comprising soft metal blades and hub, and a stiff metal core consisting of a lining part securable to the shaft, and a series of films formed thereon, each having an extension in stiffening relation to one of 90 said blades.

In testimony whereof, I have affixed my signature hereto.

GEORGE F. HURT.

It is hereby certified that in Letters Patent No. 1,323,533, granted December 2, 1919, upon the application of George F. Hurt, of Atlanta, Georgia, for an improvement in "Exhausters," an error appears in the printed specification requiring correction as follows: Page 2, line 88, claim 5, for the word "films" read *fins*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of January, A. D., 1920.

[SEAL.]

M. H. COULSTON,
Acting Commissioner of Patents.

Cl. 253—200.