Jan. 15, 1924.

1,481,188

G. B. DAMON

STACK FAN

Filed Oct. 4, 1921

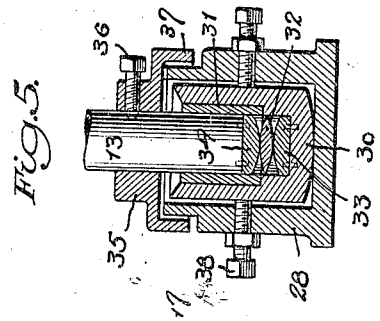


Fig. 5.

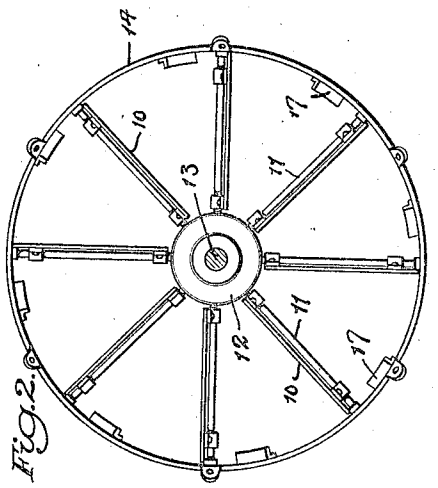


Fig. 2.

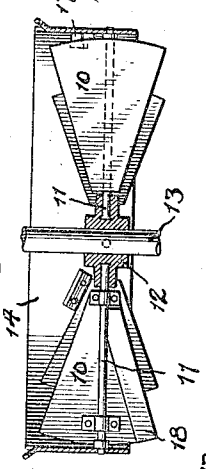


Fig. 3.

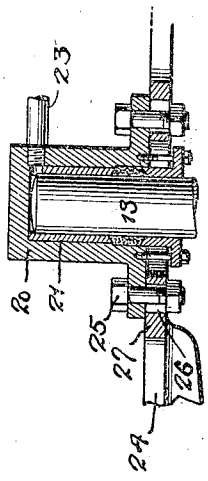


Fig. 4.

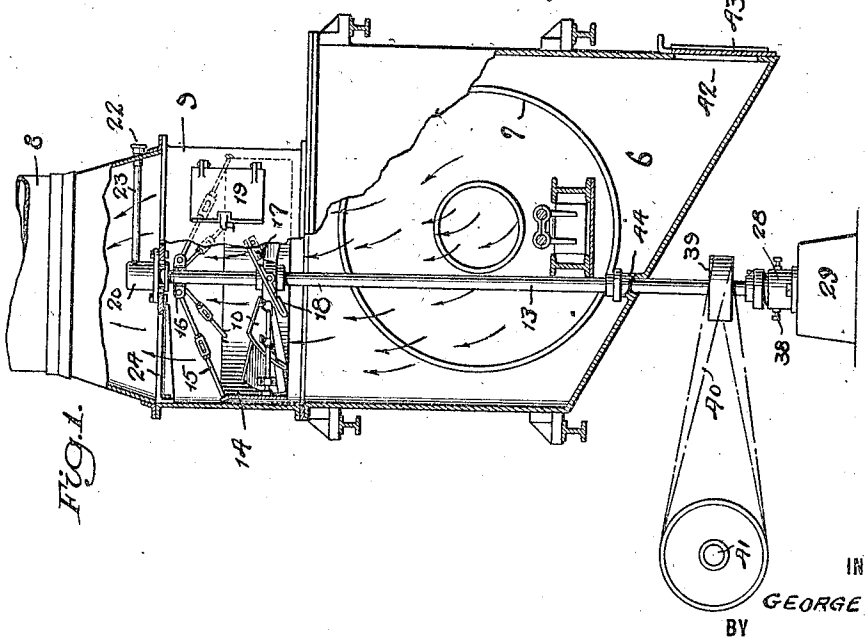


Fig. 1.

INVENTOR

GEORGE B. DAMON

BY

ATTORNEYS

Patented Jan. 15, 1924. 1,481,188

UNITED STATES PATENT OFFICE.

GEORGE B. DAMON, OF BELVIDERE, NEW JERSEY, ASSIGNOR TO VULCAN IRON WORKS, OF WILKES-BARRE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

STACK FAN.

Application filed October 4, 1921. Serial No. 505,435.

To all whom it may concern:

Be it known that I, GEORGE B. DAMON, a citizen of the United States of America, residing at Belvidere, in the county of Warren and State of New Jersey, have invented certain new and useful Improvements in Stack Fans, of which the following is a specification.

My invention relates to stack fans, and particularly to a stack fan for use with a rotary drier of the type shown in my application October 4, 1921, Ser. No. 505,434. The particular object of my invention is to provide a fan of such construction that when the fan is idle it offers substantially no obstruction to the passage of the gases through the fan area to the drier stack.

Referring to the accompanying drawings—

Fig. 1 is a broken side elevation of a drier stack in which a fan embodying my invention is illustrated;

Fig. 2 is a plan of the fan alone;

Fig. 3 is a vertical section therethrough;

Fig. 4 is a vertical section through the top bearing of the fan spindle; and

Fig. 5 is a vertical section through the bearing at the bottom of the spindle.

The installation for which the present fan is particularly designed is more fully indicated in my copending application above mentioned. In the present drawings I have indicated merely the chamber 6, to which the gases from the rotary drier 7 discharge on their way to the stack 8. Between the chamber 6 and the stack proper I arrange a fan chamber 9 within which operates the fan to which the present invention particularly relates.

In the construction shown, the fan comprises a series of radial blades 10 pivotally supported on a corresponding series of radial spindles 11 extending from the hub 12 on the fan shaft 13 to an annular supporting ring 14 which surrounds the fan blades. The ring 14 is in turn supported by a group of turn-buckle straps 15 extending upwardly to a collar 16 clamped or otherwise suitably secured to the shaft 13. At suitable points around the inner periphery of the ring 14 are arranged stop blocks 17 adapted to be engaged by the upper portion of the fan wings, and serving to halt the latter in proper inclination for the most efficient operation of the fan.

The blades 10 are so constructed and mounted on their axes 11 that when the drive of the fan is halted the blades swing to vertical position by gravity and thus afford the least possible obstruction to the passage of the gases through the fan area to the stack 8. In the particular construction shown, the axes of the fan blades are slightly above the center of gravity of each fan wing, but the area of the wing above the axes is sufficiently greater than that below the same to cause the upper portion of the wing to swing over backward (against the action of gravity) to the inclined position determined by the stop 17 under the pressure of the air against the blade when the fan is rotated. However, when the spindle 13 is halted, the over-weighted lower portion of the fan wing, under the action of gravity, automatically returns the wing to vertical position, in which it offers the least possible obstruction to the passage of the draft to the stack. The over-weighting may be accomplished in any suitable way, and is here indicated by the folding back of the lower edge of the wing as indicated at 18.

In order to keep the fan blades clean and free from accumulation of dust or soot, which might prevent their proper functioning, I provide the fan chamber 9 with a lateral opening normally closed by the door 19 through which access to the interior of the fan chamber may be obtained by the attendant for brushing the blades clean.

The top bearing for the fan spindle 13 is indicated in Fig. 4, and comprises a bearing cap 20 and bearing bushing 21, which may be oiled through a grease cup 22 communicating through the pipe 23 with the interior of the bearing cap. The latter is supported on the spider 24 by means of bolts 25, which pass through slots 26 in the central ring 27 of the spider. The play of the bolts in the slots 26 affords means for adjusting the angular position to the spindle, and the location of the fan coaxial with the fan chamber 9.

The bottom step bearing comprises a cup 28 mounted in any suitable way upon the pedestal 29. Within the cup is a bearing socket 30 with bushing 31 and lens-shaped disc 32 interposed between the end bearing buttons 33 and 34. A dust cap 35 may be mounted on the spindle by means of a set screw 36, its flange 37 embracing the up-

per edge of the cup 28. Transverse adjustment of the lower end of the spindle may be secured by set screws 38 passing through the walls of the cup and bearing against the sides of the socket member 30.

The drive of the fan may be accomplished in any suitable way, such as by a pulley 39 and belt 40 from the pulley shaft 41. A clean-out opening 42 may be provided at the lower edge of the inclined bottom of the wind chamber, while the slide door 43 normally closes this opening. It will be noted that the bottom step bearing and spindle drive are arranged outside the settling chamber 6 and that the spindle 13 passes into the latter through a bearing boss 44 formed in the inclined bottom thereof, substantially in alignment with the center of the stack.

Various modifications in detail of construction and arrangement of parts will readily occur to those skilled in the art, without departing from what I claim as my invention.

What I claim as my invention is—

1. In a stack fan, a cylindrical fan chamber, a spindle substantially coaxial therewith, a fan-supporting ring spaced from the spindle, a hanger secured to the spindle above the ring, inclined struts extending between said hanger and ring, a hub on the spindle in the plane of the ring, horizontal spindles extending between said hub and ring, and fan blades pivotally mounted on said horizontal spindles.

2. In a stack fan, a vertical spindle, a fan-supporting ring hung from said spindle and substantially coaxial therewith, together with a series of fan blades arranged between said spindle and supporting ring and driven thereby, said fan blades being pivoted on substantially horizontal axes and lying in substantially vertical planes in inoperative position.

3. A fan comprising a vertical spindle, a series of fan blades radially arranged with respect to said spindle, and pivotal supports for said blades, said blades being overweighted below their pivotal axes, but having greater surface area above than below said axes whereby on the halt of the spindle the blades swing to vertical position, whereas on the drive of the spindle the blades assume an inclined position with their upper portions following their lower portions in the direction of rotation of the fan.

4. In a fan, a vertical spindle, a supporting ring hung from the spindle and substantially coaxial therewith, together with a series of fan blades pivotally supported between said spindle and ring, and adapted to assume the vertical position when the fan is at rest, together with stops on said ring engaged by the blades to halt the latter in inclined position when the fan is driven.

5. In a fan rotating on a vertical axis, a series of fan blades pivoted on radial axes, each of said blades comprising a sheet of metal folded over at its lower edge to overweight the blade below its pivotal axis, while decreasing the area of the blade below said axis to render it less than the area of the blade above the axis.

6. In a fan, a fan casing, a fan arranged within said casing, a vertical fan spindle extending below said casing, a bearing for the lower end of said spindle, means for driving the spindle at a point below the casing, a top spindle bearing arranged within the casing, and a lateral lubricating duct leading to said top bearing through the casing.

7. In a fan, a vertical spindle, a sheet metal cylindrical fan ring surrounding the same, a hanger secured to the spindle above the ring, turnbuckle straps suspending the ring from the hanger, and horizontal blade spindles extending radially from the ring toward the spindle, overweighted fan blades pivoted on said horizontal spindles, and stop brackets arranged around the inner periphery of the ring and serving to halt the blades in inclined position when the fan is driven.

In testimony whereof I have signed my name to this specification.

GEORGE B. DAMON.