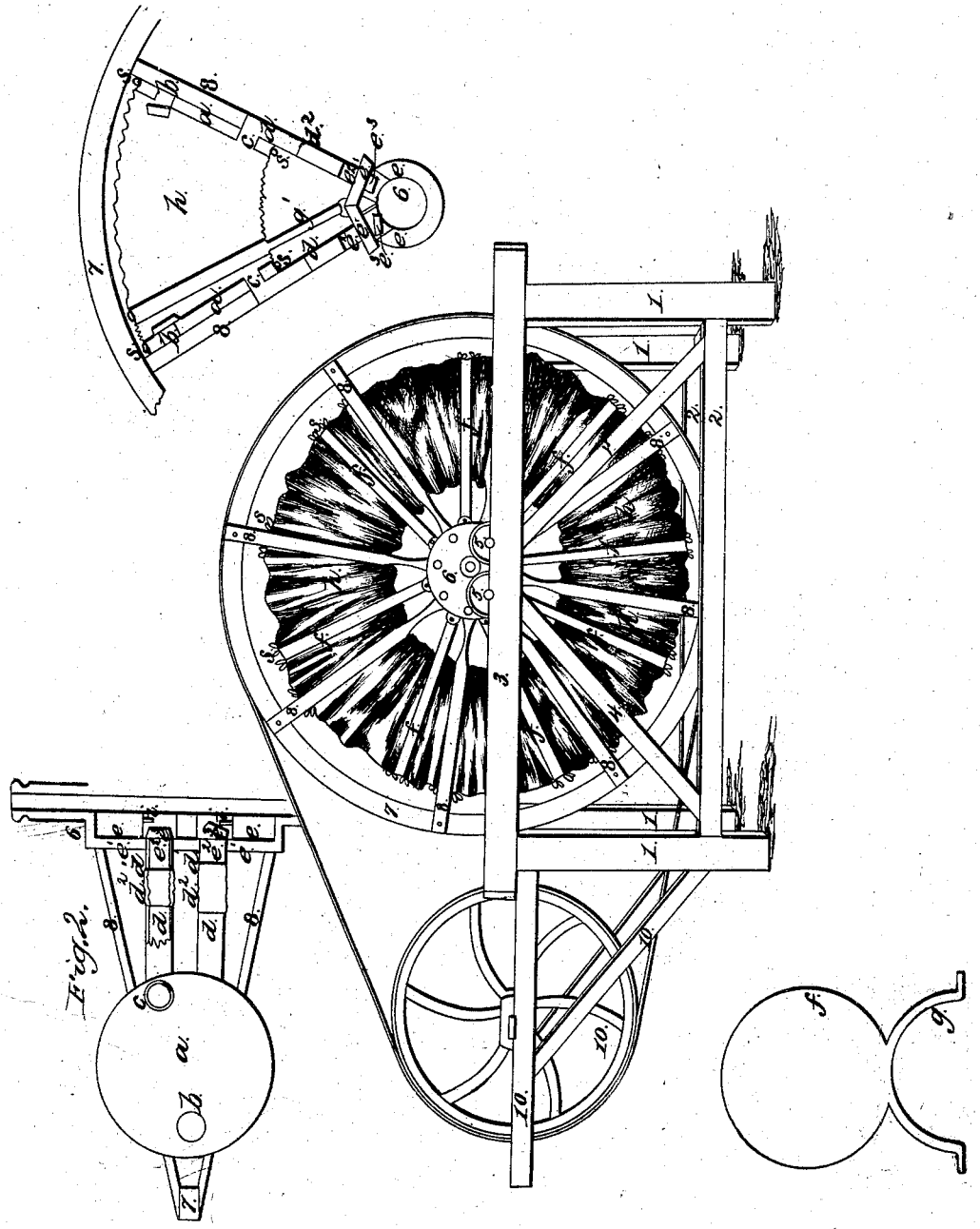
Savage & Killam,

Bellows

No. 3,350. Patented Nov. 24, 1843.



UNITED STATES PATENT OFFICE.

A. SAVAGE AND HERVEY KILLAM, OF SCOTTSVILLE, NEW YORK.

ROTARY BELLOWS.

Specification of Letters Patent No. 3,350, dated November 24, 1843.

To all whom it may concern:

Be it known that we, ALVIN SAVAGE and HERVEY KILLAM, of Scottsville, in the county of Monroe and State of New York, have invented a new and useful Machine for the Purpose of Collecting Atmospheric Air by Means of Revolving and Self-Acting Bellows; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

At figures 1, 1, 1, 1, is represented the four posts of the frame, 12 and ¾ inches in height to top of plates, being 1 by 1½ inches square.

Figures 2, 2 represent the two horizontal girts, one by ¾ of an inch square, three inches from foot of posts to top of girts and are 22¼ inches long between the posts, and figure 3 represents the two plates of the frame, 28 inches long, 1 by 1½ inches square.

At figures 4, 4 is represented four braces two on either side of the frame extending from girts to plates to support them at the center and strengthen the frome, ¾ by ½ inch square, there being at each end of the frame two ties or cross girts 8 inches long between the posts tenoned at each end and framed in to the said posts, the top of the bottom girts two inches from the bottom of the posts and the top or upper girts 2¼ inches down from the top of the plate, said girts being 1 by ¾ inch square.

At figures 5, 5 is represented two friction rollers two inches diameter ⅓ inch thick with journals on each side of them ¾ inch diameter and ⅓ inch long, there being a mortise in the top of the plates 4½ inches long at their centers and ⅓ inch wide sufficient in depth to let the said roller journals in to them so as to control and govern them. The round dark spot as shown between the friction rollers at figures 5, 5 is to represent a hole or hollow journal half an inch in diameter and resting upon them, and the light shade or circle surrounding the same represents the journal ⅝ of an inch diameter and its length 2⅓ inches, with the outer ends turned with a bead and hollow in such form that a flexible or leather pipe may be drawn on to the end of it and made fast by means of a string or cord put around the same and drawn sufficiently tight into the said hollow to make it tight and secure for the purpose of conducting the forced air from the cylinder to any desired point or object.

Figure 6 represents the end or head of the cylinder or shaft it being made of cast iron or other suitable metal 4¼ inches diameter with the journal above described 1¼ inches diameter next to the head, the said hollow gudgeon or journal being in a diminished or tapering form, and extends outward on each end of the cylinder 2⅛ inches as above stated, the said head of the cylinder is half an inch thick on its outer surface having a recess on the side of the head next the cylinder ¼ of an inch deep forming a flange all around it ¼ inch deep, into which the end of a wooden cylinder being prepared and closely fitted into and up against the said flange and made fast to it by eight screws or bolts passing through the said head and into the wood part of the cylinder there being burs or nuts let into the same for receiving said bolts forming what is called joint bolts, making all tight and secure. The wooden part of the shaft of the cylinder above had reference to is six inches long 4¼ inches diameter and eight square ⅞ of an inch thick with a hollow in it 2½ inches diameter.

Each of the sides or squares of the cylinder is prepared for receiving the other parts to be connected therewith and attached to it in the following manner, viz: At a distance of ⅝ of an inch from each end is a mortise ½ an inch long and ¾ inch wide for the purpose of receiving the eight sets of arms as represented by figures 8, 8, 8, 8, 8, 8, 8, 8, 10 inches long ½ inch thick by 1⅛ inches wide extending from the cylinder outward to the outer extremity of the rim Fig. 7 and made fast to the rim on each side with screws, the rim being 24 inches diameter, inch wide by ¾ inch deep, forming a band wheel or pulley onto which a belt or strap may be applied leading from any revolving body driven by any power sufficient for propelling the same. The arms as above described stand in an oblique position approximating toward each other they being 3¾ inches apart at the cylinder and one inch apart at the inside of the rim to which they are made fast at their outer extremities, and at a distance of ⅜ of an inch from the cylinder we hollow out each edge of the arm making it ½ an inch wide a distance of 2¼ inches for the purpose

of making a more open space or room to come at other parts of the work. There is put onto each edge of each pair of arms as above described what we call the stationary heads (*a*) of the bellows (and screwed fast to them with four wood screws) each six inches in diameter ¼ inch thick and is round with a groove or hollow all around its outer edge, for the purpose of winding a cord two or three times around said head after the leather covering is put on to them to make it fast and tight, or it may be nailed on. Each of the heads has a round hole (*b*) bored through it one inch in diameter, and one inch from the outer edge of the head to the hole and has a valve to cover it that may close or open as the action of the vibrating part of the bellows may require, and in each of the heads there is one other hole (*c*) ¾ inch diameter, and ⅝ inch from edge of head to side of hole, the center of the last mentioned hole is ¾ of an inch one side of a center line drawn across the head through the center of the first hole, into the last mentioned hole we put a tin or metal right angled tube or pipe *d* filling up the hole perfectly tight, it being one inch long measured from the longest or outer corner which passes into and through the head, and is two inches long on the other angle which extends downward in toward the center of the cylinder shaft, two of the heads as above described are put onto one set of arms, one on each side of them with their valves and pipes as above described prepares the communication to the cylinder for two halves of two of the bellows, and so on in succession to each set of arms all around. The wooden part (*e*) of the cylinder as before described has two mortises on each side or square 1½ inches distant from each end of the cylinder 1¾ inches long by one inch wide leaving a stationary piece between them ⅜ inch. The cylinder being prepared as last stated, we put on to each of the sides or squares successively a piece of wood *e'* 3¾ inches long ⅜ inch thick and of sufficient width to miter or meet at the corners of the squares all around the cylinder, and are made fast to it by wood screws that they may be taken off as may be required, the last mentioned pieces (*e'*) have two holes (*e''*) bored through them shown in section Fig. 2 to correspond with the mortises which they cover ¾ inch diameter in a position to have a valve (*e*³) cover them and vibrate working in the mortises in the cylinder with a stop (*i*) fixed in the mortises that the valves may not open too far, the last mentioned ¾ inch holes have a tin tube *d'* or pipe in them ¾ inch long extending outward ½ an inch and in a line to correspond with the long part of the right angled tube before described. Onto the said tubes or pipes we prepare and put on to them a leather tube *d*² of sufficient length to receive the tin tubes into it and make it fast to them by tying cords around each, which completes the communication through which the air from the bellows passes in to the cylinder.

The yellow shaded spots around the outer part of the cylinder head Fig. 6 represent the female part of a metal hinge made in a right angle form, the bed part of it one inch long ⅝ inch wide and ¼ inch thick with a hole in it to admit of a wood screw that makes it fast to the cylinder, the right angle or projecting part extends outward half an inch and has a horizontal hole in it ¼ inch diameter for the purpose of receiving the male part of the hinge, there being two of them on each side, one at each end of the cylinder which is a part of and connected with the center or vibrating part of the bellows, which vibrating part is in form as follows, it being made of metal to obtain the necessary heft required.

The center or vibrating part (*f*) of the bellows is six inches diameter and round, 1¼ inch thick on the outer edge and ⅞ inch thick on the opposite or inside edge being in the form of a wedge having a hollow or groove of ½ of an inch on each edge of its periphery for the purpose of receiving a cord *s* wound two or three times around it to hold fast and make tight the leather or covering of the bellows, and there is attached to and cast with the vibrating part of the bellows as above mentioned on its thinnest edge at the center a piece (*g*) projecting out from it toward the center ½ an inch wide by ¾ inch thick and extending each way in a curved or circular manner forming a bail and at each end there is a right angle or turn ¼ inch diameter and ¼ inch long which forms the male part of the hinge above mentioned. The aforesaid several sections as described being all in their respective places, and the leather (*h*) in form for covering or other flexible material, they are put on to their respective places and secured by cords drawn into the hollow grooves as before mentioned, each bellows cover has a wire hoop on the inside for keeping them smooth. All the parts being arranged as above described we proceed to turn the bellows wheel about 40 revolutions in a minute, and as the air is received in to each of the bellows between the arms and heads attached to them on the inside and under the outer rim of the wheels, the vibrating part of each bellows moves one way on the descending side of the wheel by its own gravity and forces the air into the cylinder and while the vibrating head is closing one half of the bellows the other half of the same bellows is expanding and filling with air and is ready to vibrate back on the ascending side of the wheel and so on alternately in succession performing sixteen vi-

brations to every revolution of the wheel forcing the air out at both journals of the shaft at the same time with a steady and constant blast.

That part represented at Fig. 10 and attached to the bellows frame is not designed to form any part of the invention, and was attached for no other use but to turn the bellows wheel, and to represent the manner in which it may be driven or used, which is by a belt or strap, as it also may readily be driven by segments put onto the outside of the rim of the bellows wheel, with a pinion or driving wheel to work into it, driven by gears.

The dimensions of the several parts of the revolving bellows as described in the foregoing schedule is about one-third the size of a bellows required for small country furnaces that will melt from three to six hundred pounds of pig iron in an hour, and may be varied in size for a greater or less quantity as required, except the thickness of the vibrating casting, which will remain about the thickness described heretofore.

What we claim as our invention and desire to secure by Letters Patent is—

The order and arrangement of any number of bellows in succession around any given diameter of circle forming a bellows wheel, the center part of the bellows being moved and the outsides stationary forming a double stroke it being a new arrangement by which we collect atmospheric air into its outer extremity and force it into the cylinder or shaft of the wheel and discharge it out at its center, being wholly done by the power of falling bodies or gravitation, said bodies being so arranged as to vibrate and of sufficient size and thickness so as to produce any desired quantity or velocity of air that may be wanted for ordinary purposes, as for forges, furnaces and all other purposes to which the same may be applied with a perfect regular and steady blast.

ALVIN SAVAGE.
HERVEY KILLAM.

Witnesses:
THOMAS COLLER,
HENRY TARBOX.