G. L. H. BEHRNS.

EXHAUST FOR MILLSTONES.

No. 183,248. Patented Oct. 17, 1876.

Fig. 1.

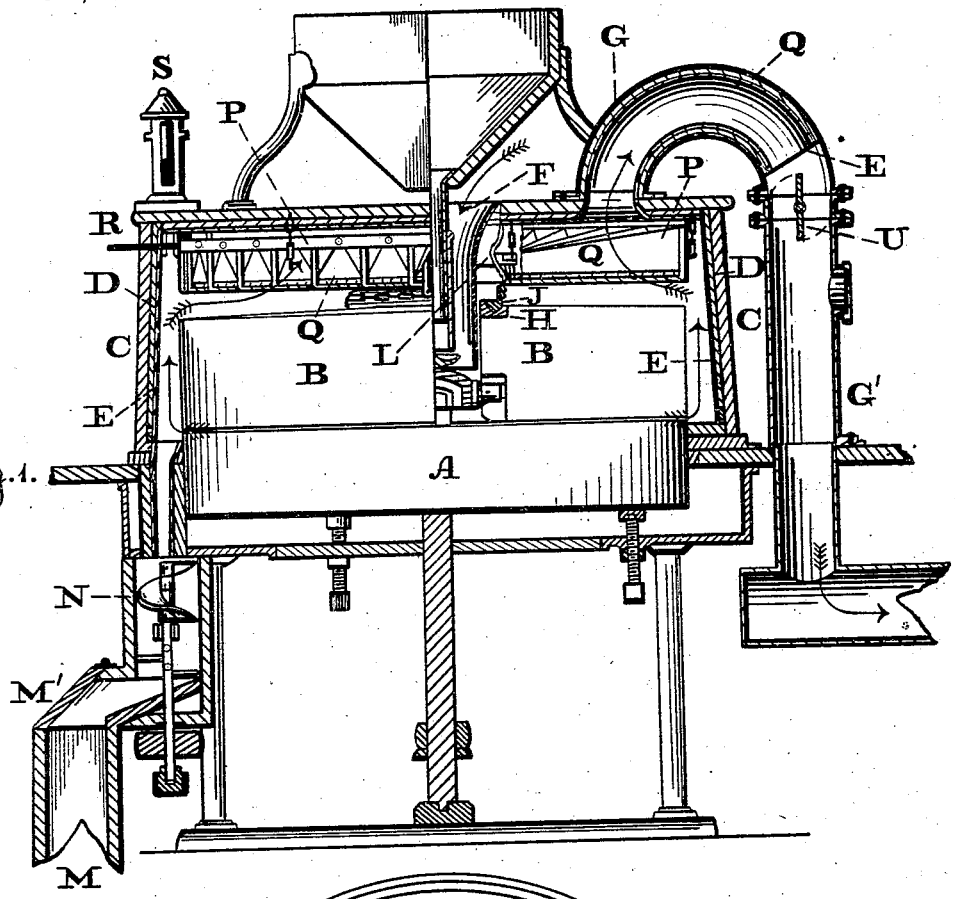
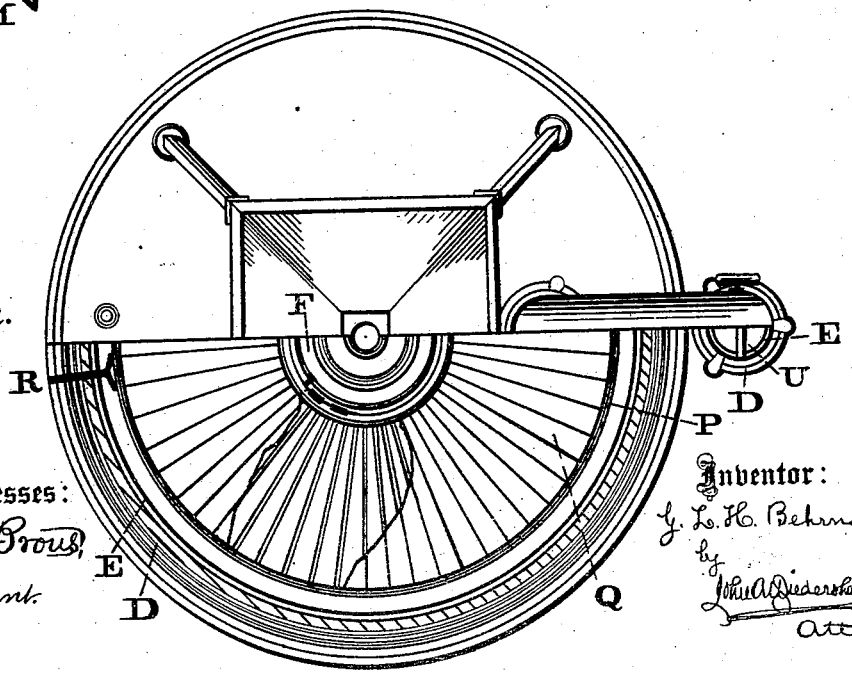


Fig. 2.



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IMPROVEMENT IN EXHAUSTS FOR MILLSTONES.

Specification forming part of Letters Patent No. **183,248**, dated October 17, 1876; application filed January 15, 1876.

To all whom it may concern:

Be it known that I, GUSTAV L. H. BEHRNS, of Lübeck, Germany, have invented a new and useful Improvement in the Exhaust of Stones of Flour-Mills; and I do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which my invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a sectional elevation, and Fig. 2 is a plan, partly sectional, of a mill embodying my invention.

Similar letters of reference indicate corresponding parts in the two figures.

My invention relates to improvements in the exhaust of millstones of flour-mills, whereby a more powerful exhaust may be employed than heretofore, resulting in a greatly-increased yield from the millstones, while at the same time the presence of stive in the mill is avoided, moisture is effectually removed, and the stones are kept perfectly cool while grinding.

The invention consists of an air-tight casing, and an inner lining of sheet metal, and fabric for protecting the interior of the casing from the lower temperature of the surrounding air, and thus preventing any condensation of moisture within the casing, so that all moist vapor resulting from the grinding shall pass off with the exhausted air.

It also consists in preventing the spout or funnel that conducts the grain and air into the eye, and the eye itself, from communicating with the interior of the casing.

It further consists of means for forcing down the meal in the discharge-spout, and closing the same against the entrance of air.

It also consists of a screen, through which the whole of the air and moist vapor exhausted from the casing has to pass before escaping through the exhaust-aperture, the screen intercepting all particles of flour that the air would otherwise carry away with it, and so constructed as to present a large surface.

It further consists of the exhaust-pipe protected from the cooling influence of the external air at the part nearest the millstone casing, in order to prevent the moist vapor that passes away with the air from condensing in that part of the pipe until it has passed the bend of the pipe. After passing this bend the moisture is allowed to condense and flow in the pipe.

Referring to the drawings, A and B represent the lower and upper millstones, respectively. C represents the casing, which is lined with felt or other suitable non-conducting material, D, and metal plating E, so as to be air-tight, and protect the interior of the casing from the influence of the external atmosphere. F represents an air-tube concentrically surrounding the eye-tube, by which the grain is supplied to be ground. On the upper stone B there is a metal ring, H, which is let into and fixed in said stones, and has a V-shaped groove on its upper face, into which groove is fitted another ring, J, whose lower face corresponds to that of the groove of the ring H, said ring J being prevented from revolving in any suitable manner.

The ring is also connected to a flexible inclosing-band, L, suspended from the top of the casing, so that while the upper stone B and ring H revolve, the ring J, with the inclosure L, forms an air-tight separation between the eye of the stone and the interior of the casing, the ring J being allowed to accommodate itself to any eccentricity in the movement of the stone B. G represents an air-tube, connecting the upper part of the casing C with a fan or other exhauster. The bend of the tube is lined, like the casing C, with felt and metal plating D E, to prevent condensation of moisture within the tube until the air flowing through it shall have passed the bend, and in the tube is a valve, U, for regulating the draft of air through it. M is the outlet for the flour. It is made with a bend, M′, above which is a screw, N, caused to revolve by a strap working a pulley on the screw-shaft by a pulley on the stone-spindle. The effect of the screw N is to compress the flour on the inclined part of the bend below it, and thus render it sufficiently compact to prevent ingress of air to the interior of the casing through the flour-passage M. P represents a cylindrical grating suspended from the cover of the casing C, and Q represents a porous

wool or hair fabric attached to the upper rim of the grating P, and arranged zigzagwise, so as to form a series of radiating ridges and furrows, exposing a large surface for the passage of air through it, the fabric being sufficiently porous for the passage of air, but not for the passage of the fine or dust flour.

An arm, R, is attached to the grating P, and projects through the casing C, and it is caused to oscillate in the direction of its length by a cam, wiper, or other convenient means, so as to give a jigging movement to the grating P and fabric Q, for the purpose of shaking the dust from the under surface of the fabric Q; or the arm R may for this purpose simply be struck slightly from time to time with a hammer. S is a gage fixed on the casing, and communicating with the space in the casing outside of the grating P, and also with the space above the fabric Q, so that it indicates the pressure within the spaces, respectively. The arrows in Fig. 1 indicate the course of the air drawn by the action of the exhauster down the tube F, between the working faces of the millstones, thence through the pores of the fabric Q, and by the pipe G to the exhauster.

By the above-described arrangements it will be seen that a powerful exhaust can be applied to the casing C through the tube G, whereby a strong current of air will enter between the millstones from the air-tube F, resulting in a greatly-increased yield of flour for a given motive power, any entrance of air into the casing except through the eye of the millstone being prevented by the inclosure L, and by the combined action of the bend M′ and screw-blade N in the meal-spout. The air, on issuing from the circumference of the stones, has first to pass through the screening-surface Q before it can enter the tube G, whereby all particles of flour carried with it will be retained in the casing, thus preventing any loss through the formation of stive, and dispensing with the use of the usual stive-room. At the same time any condensation of moisture, either between the millstones or in the casing and in the bend of the tube G, is prevented by the before-described non-conducting lining to the casing and bend of the tube, whereby the formation of paste between the millstones and the consequent clogging of the grinding-surfaces is obviated. After passing the bend of the tube G, the moisture contained in the exhausted air is allowed to condense on the surfaces of the portion G′, and to flow along the same, in order eventually to be discharged at the outside of the mill.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The improvement in the construction of millstone-casings, the same consisting of the exterior casing C, the interior metal plating D, and the intermediate non-conducting material E, substantially as and for the purpose set forth.

2. The inclosing-band L, in combination with the ring H, fixed to the upper stone, and the ring J, suspended from said band L, the two rings having a tongue and groove, respectively, on adjacent faces, substantially as and for the purpose set forth.

3. The discharge-spout with the bend M′ and the screw N, for preventing ingress of air to the casing by the flour-spout, substantially as herein described.

4. The grating and screen P and Q, for sifting the air on its way to the exhaust-pipe, substantially as herein described.

5. The combination, with the millstone-casing, of the exhaust-pipe G, having its bend internally lined with non-conducting material E and metal plating D, and the portion G′ below the bend unlined, substantially as and for the purpose set forth.

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