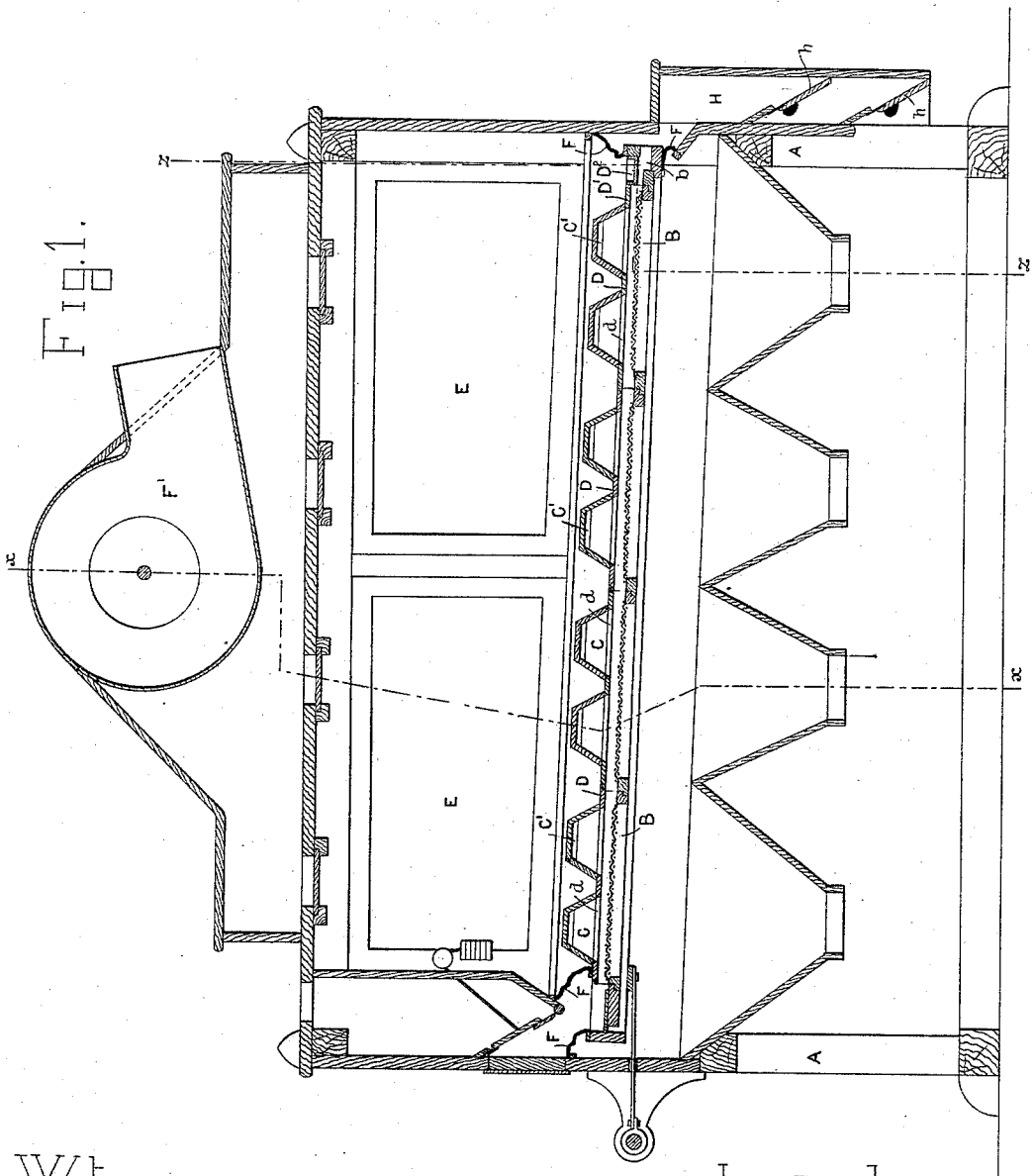
(No Model.) 2 Sheets—Sheet 1.

J. HIGGINBOTTOM.

PURIFIER AND SEPARATOR.

No. 448,520. Patented Mar. 17, 1891.

Fig. 1.



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Fig 2

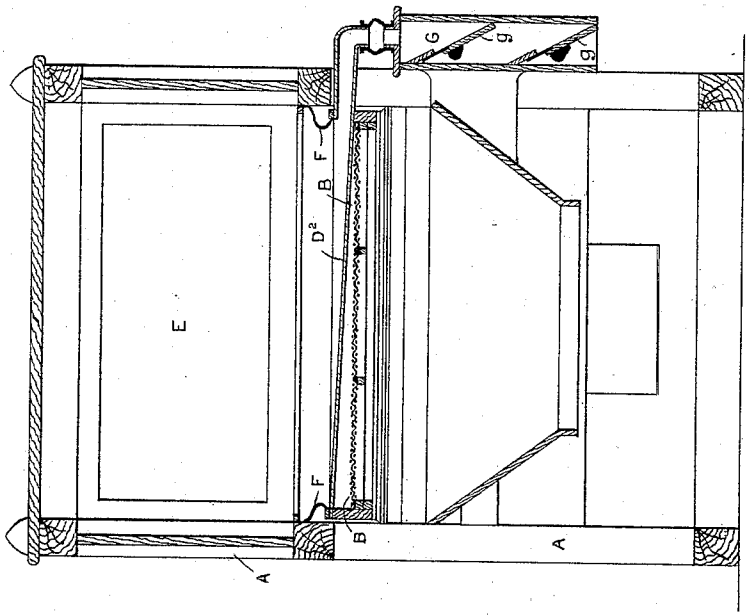
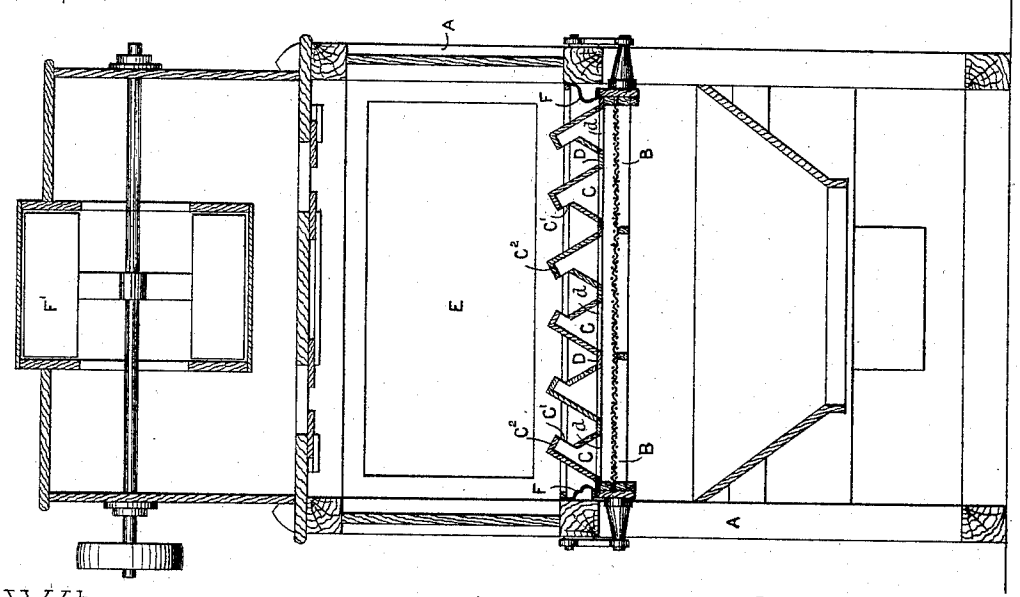


Fig 1



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES HIGGINBOTTOM, OF LIVERPOOL, ENGLAND.

PURIFIER AND SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 448,520, dated March 17, 1891.

Application filed December 6, 1888. Serial No. 292,784. (No model.) Patented in England October 13, 1888, No. 14,711.

To all whom it may concern:

Be it known that I, JAMES HIGGINBOTTOM, milling engineer, a subject of the Queen of Great Britain, residing at Liverpool, in the county of Lancaster, in the Kingdom of England, have invented certain new and useful Improvements in Purifiers or Separators, (for which I have obtained Letters Patent in Great Britain, dated October 13, 1888, No. 14,711,) of which the following is a full, clear, and exact description.

This invention relates to separating or purifying apparatus; and it has for its object, mainly, the separating of dust, cellulose, and branny matter from flour, dust, (fine or small middlings,) middlings, semolina, and the like, the separating of light refuse from wheat or other grain, and the separating of wheat and other grain from stones.

The accompanying drawings show various views of my improved apparatus, Figure 1 being a longitudinal vertical section, and Figs. 2 and 3 transverse sections on lines $x\,x$ and $z\,z$, Fig. 1, respectively.

A is the frame-work of an ordinary middlings-purifier; B, the vibrating sieve thereof.

When applied to middlings-purifiers having vibrating sieves as ordinarily constructed, the invention is carried into effect as follows: A series of nozzles C is fixed above the surface of the silk or metal covered vibrating sieve B and in close proximity thereto. These nozzles are hollow, and they are either rectangular, circular, or elliptical in cross-section, and they can be made with either straight or conical sides. It is preferable to make them pyramidical, as shown, or conical in shape, and to arrange them with their bases nearest to the sieve-surface, and to form their sides with a slope of about sixty degrees on both their exterior and interior surfaces. It is also preferable to make the cone or pyramid of such a depth that the area of the base is about six times the area of the top. Partitions or trays D, of wood or metal, are placed above the surface of the sieve B and in air-tight connection with it, and also preferably with an upper air-tight exhausting-compartment E. The trays D, which preferably vibrate with the sieve B, are provided for the purpose of, first, carrying the said nozzle C; secondly, forming the bottom of an air-tight exhausting-compartment E (or other compartment) above the sieve, the said compartment being adapted to receive the separated matter, and, thirdly, for the purpose of automatically discharging the said separated matter.

The pyramidical nozzles C are attached in an air-tight manner, and preferably by their bases, to the air-tight tray D, and the tray is in this case provided with holes d opposite to and corresponding with the openings in the bases of the nozzles. The nozzles may be open at the top; but it is preferable to make them with a closed top and to place the discharge-aperture C′ on the side or sides close to the top, as shown in Figs. 1 and 2. The openings C′ may with advantage be provided with hoods C^2, for a reason herein set forth; but these hoods are not absolutely necessary.

The nozzles may be made of wood, as shown, or of thin metal, card-board, or other suitable material, and they may be attached to the tray in any convenient manner or even formed in one therewith. Where a vibrating tray and nozzles are employed, it is preferable to use a flexible air-tight connection F, made of cloth impermeable to air for preventing any of the outer air, except that which passes through the nozzles, from entering the upper part E of the apparatus.

The separating-nozzles and the tray need not in all cases be attached to the vibrating sieve. They may be vibrated separately or they may be stationary, and in this latter case it is preferable to make an air-tight flexible attachment between the stationary tray and the vibrating sieve.

When in work the action of the nozzles is as follows: The air being drawn into the apparatus by the fan F′ in the usual manner, and rising through the sieve-surface carries off the material to be separated and enters the bases of the nozzles C. After entering the nozzles the air and the matter contained therein acquire a gradually-accelerated velocity, owing to the converging sides of the interior of the nozzles. The velocity of the uprising air-current is so regulated that the heavier particles remain on the sieve-surface and the lighter matter to be separated enters the base of the nozzles and is carried upward by the accelerated air-current. The uprising

air, with its contained separated matter, on leaving the orifices C′ of the nozzles expands and decreases in velocity. Owing to this decreased velocity the separated matter is deposited upon the upper surface of the air-tight tray D. The deposition is also assisted by the hoods C^2, which deflect the current downward. After the air has passed through the nozzles it is led away in the usual well-known manner by means of air-trunks or directly by a fan or fans F′. The separated matter when deposited upon the surface of a vibrating tray D is carried down by the vibratory motion to the tail or lower end D′ of the same, is discharged therefrom by means of a vibrating spout or duct D^2, and is led away to the side or end of the machine, as shown in Fig. 3, at which point it is discharged into a worm-box or into a stationary hopper G. Such discharging-hopper is fitted with an air-tight apparatus, such as the well-known balanced and hanging valves *g*, which prevent the entry of the outer air to the machine while the hopper is discharging. The material remaining on the sieve, from which the separated matter has been removed, is discharged through a similar hopper H, Fig. 1, having air-tight balanced valves *h h*.

When the invention is applied to the separation of light refuse from wheat or seeds, the vibrating sieve-frame is clothed with suitable perforated metal in lieu of the ordinary silk gauze. This perforated metal allows the dust and small dirt to pass through its perforations. The grain or seed after being treated passes over the tail *b* of the sieve, and the light separated matter passes, as before described, through the nozzle-orifices C′ onto the upper surface of the vibrating tray D, and is discharged therefrom through the hopper G.

When the invention is applied to the separating of wheat or beans or other grain or seeds from stones, the wheat, &c., is lifted by the air-current (which is of course much more powerful than in the previous cases) and is deposited on the upper surface of the tray D, the stones being, as before, discharged over the tail *b* of the sieve. When the separated matter is deposited on the surface of a stationary tray D, it may be removed by means of a traveling brush-scraper or its equivalent.

I caim as my invention—

1. In combination with a vibrating sieving-surface and an exhausting-chamber above it, a tray or diaphragm separating the two and perforated regularly throughout its area by apertures arranged upon it in longitudinal and transverse series and tapering upward in both horizontal dimensions, whereby the exit-spaces for air are narrowed to a desirable minimum both longitudinally and transversely and a maximum of contraction and slope of passage is secured with a minimum of height and obstruction, substantially as described.

2. In a separating or purifying apparatus of the kind described, the combination, with a vibrating sieving-surface B, of a superposed tray D in air-tight connection with it and with an upper exhausting-compartment E, and a series of nozzles C, tapering in both horizontal dimensions and distributed regularly over said tray both in longitudinal and transverse series, with their open bases located as close as practicable to the sieve-surface and their upper narrower ends communicating above the tray with said exhausting-compartment E, substantially as and for the purpose set forth.

3. In combination with a vibrating sieving-surface B, a superposed tray D, vibrating therewith, and an exhausting-compartment H above said tray, a series of hooded nozzles C, tapering in both horizontal dimensions and arranged in a regular manner, as described, on said tray, with their open bases located as close as practicable to said sieving-surface and having each a lateral discharge-orifice C′ at its upper end below said hood and opening into said exhausting-compartment, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES HIGGINBOTTOM.

Witnesses:

GEO. C. DYMOND,

H. P. SHOOBRIDGE.