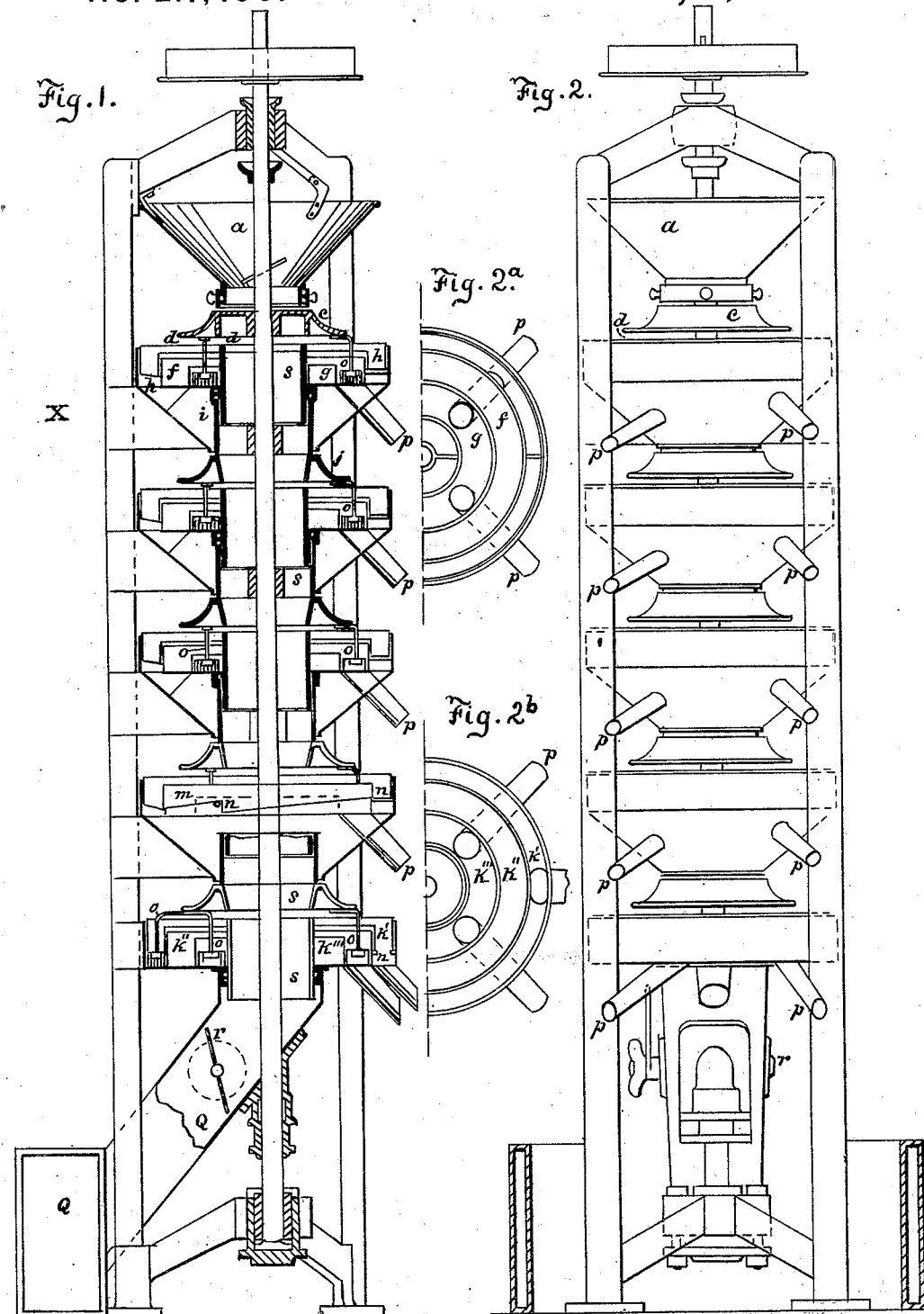


F. THOMPSON & W. H. WILLIAMSON.  
Machine for Purifying and Assorting Semolino, &c.  
No. 217,430. Patented July 8, 1879.



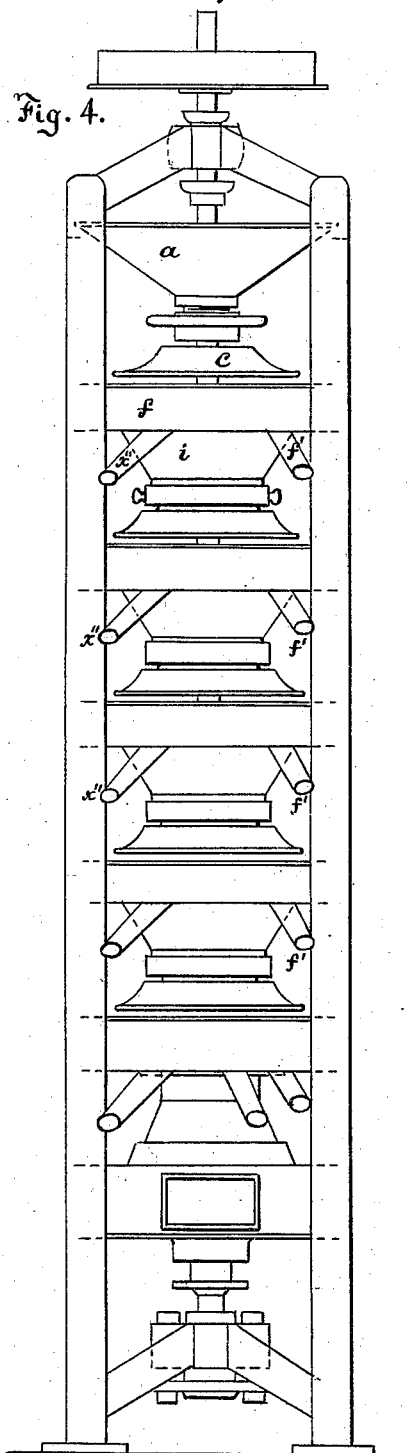
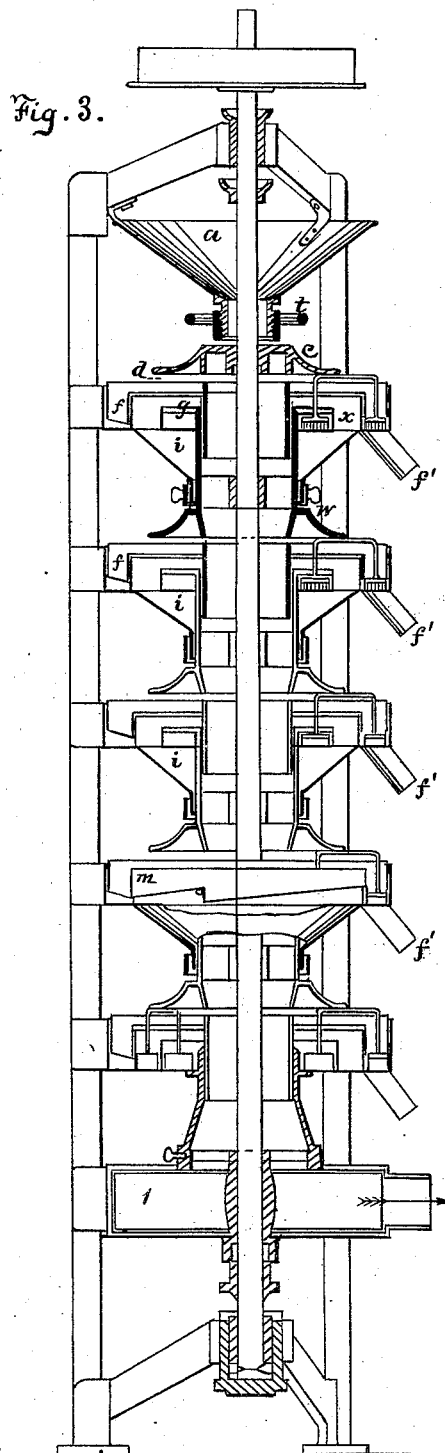
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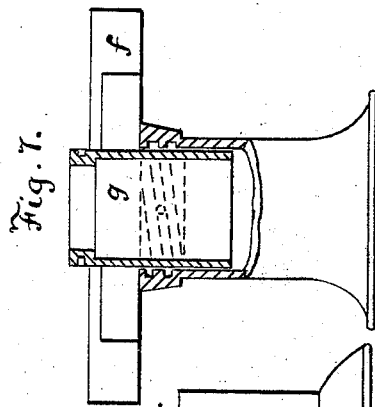


Fig. 7.

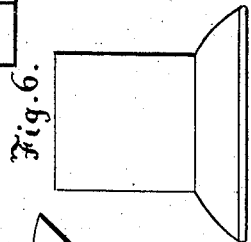


Fig. 6.

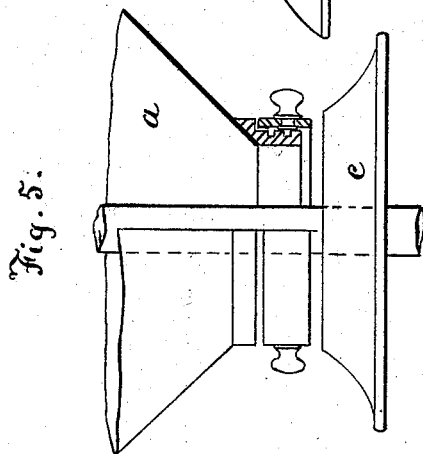


Fig. 5.

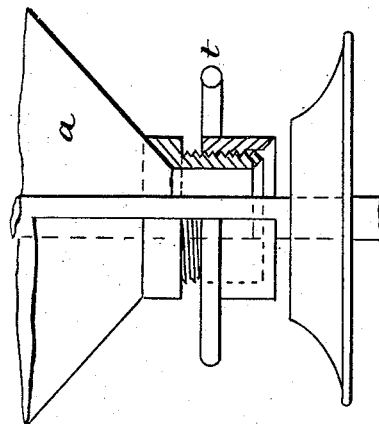


Fig. 10.

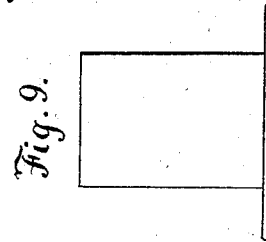


Fig. 9.

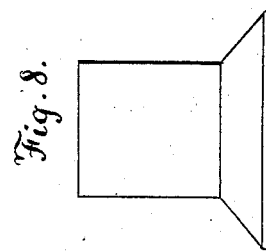


Fig. 8.

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# UNITED STATES PATENT OFFICE.

FREDERICK THOMPSON, OF WAKEFIELD, AND WILLIAM H. WILLIAMSON,  
OF LEEDS, COUNTY OF YORK, GREAT BRITAIN.

## IMPROVEMENT IN MACHINES FOR PURIFYING AND ASSORTING SEMOLINO, &c.

Specification forming part of Letters Patent No. **217,430**, dated July 8, 1879; application filed April 2, 1879.

### *To all whom it may concern:*

Be it known that we, FREDERICK THOMPSON, of Wakefield, in the county of York, Kingdom of Great Britain and Ireland, and WILLIAM HENRY WILLIAMSON, of Leeds, in the same county, have invented new and useful Improvements in Machinery or Apparatus for Purifying and Assorting Semolino, Middlings, Corn, and other matters, of which the following is a specification.

This invention relates to machines designed to effect a gradual and complete cleaning of the matters dealt with, and the assortment of the cleaned material and of the more valuable offals or refuse matters abstracted at each cleaning stage.

By our invention all the operations are effected during the passage of the material once through the machine.

Our improved machinery is applicable for treating semolino, middlings, corn, seeds, and such matters, &c. The principle on which it operates may be stated thus: The material to be treated is fed into the top of the machine, and, falling by gravity, is at successive stages in its descent through the machine subjected to a regulated winnowing process. At each of these cleaning stages the falling material is distributed by centrifugal force into a shower or thin stream, through which a current of air is drawn, which winnows or eliminates the lighter matters from the falling shower, but allows the heavier matters to descend for subsequent treatment at the successive cleansing stages; or the heaviest matters may be retained and less perfectly cleaned matters may descend for further treatment in the successive stages. The several assorted kinds of heavy or light matters are swept from the receptacles in which they are collected at the several cleaning stages into separate spouts or chutes, down which they fall from the machine.

The machine is constructed with a series of hoppers provided with annular collecting compartments or trays. The pan and trays composing each set are concentric, and the several sets are arranged one above another. They are maintained at suitable distances

apart by attachment to uprights or pillars. A central shaft supported in an adjustable foot-step passes through the centers of the entire series of pans, and is caused to revolve by any suitable means. Fixed upon this shaft at suitable distances apart and one above another is a series of distributors, each having an air passage or thoroughfare through it. The base of each distributor is situated a short distance above an adjacent set of pans, into which it distributes material. The upper portion of the distributor is inclosed by the hopper of the set of pans next above it. The central passages through the distributors and the central tubular portions of the sets of pans form together a central annular air chamber or space, which surrounds the shaft, and is, therefore, an annular space; it extends almost throughout the machine. Into this central air-chamber or air-shaft air and matters floating with it are drawn from all the cleaning-stages by a fan or exhaustor connected directly to the said central air-chamber either at the top of the machine, or it may be at the bottom. The fan or exhaustor may revolve with or upon the central shaft of the machine; or the central air-chamber of one or more machines may be connected to an air-trunk in communication with any ordinary or other suitable fan or exhaustor some distance removed, which would exhaust from the machines so applied. A valve is provided between the fan or exhaustor and the central air-chamber for the regulation of the air-currents, and where the fan or exhaustor is applied to the bottom of the air-chamber the top is closed, and vice versa. The current of air entering the central air-chamber at each cleaning-stage is further regulated by moving the central tubular portions of the pans toward or from the bases of the distributors. The sides of the annular pans and trays or compartments in each set are adjustable in height by means of belts able to slide up or down, and the matters received in the hoppers of the pans may be fed and regulated upon the distributors by means of an adjustable belt fitted to the mouth of the hopper. Sweepers are attached to the base of the distributor, moving

with it, and in the annular pans, conveying the collected material to spouts or chutes, down which it falls from the machine.

The construction and operation of this modification of machine are as follows: The matters to be cleaned having been first sized into various sizes by any suitable sieve or reel, each size may be treated separately in one of the above machines, or successively in the same machine, the parts of which can be adjusted to suit the material dealt with.

Referring to the accompanying drawings, Figure 1 is a sectional elevation of a machine, in which the central annular air-chamber is in connection with an air-trunk, as aforesaid, and the trays are arranged for the descent of the heavier material through successive operations. Fig. 2 is an outside view of the same machine. Fig. 2<sup>a</sup> is a half-plan of the X tier of trays. Fig. 2<sup>b</sup> is a half-plan of the bottom tier. Fig. 3 is a sectional elevation of a modified machine, in which the pans are arranged for the descent of the lighter (less perfectly cleaned) material winnowed out at each stage and treated through the successive stages, the fan or exhauster being connected direct to the air-chamber, and its disk revolving with the central machine-shaft. Fig. 4 is an outside view of Fig. 3.

The sized matter is fed into the hopper *a*, Fig. 1, the mouth of which is fitted with an adjustable belt. (Shown in detail at Fig. 5.) Three or more projecting pins, fixed to the inside of the belt, slide in a spiral groove or recess, *b*, cut in a ring attached to the mouth of the hopper, which enables the belt when moved around to be adjusted above the distributor, thus regulating the flow of material thereon.

The distributor *c*, in rotating, throws the falling material in a shower or thin stream, through which a current of air is drawn in the opposite direction by the fan or exhauster into the air-chamber at *d*.

Fig. 7 shows in detail the mode of adjusting the central tube or chamber to or from the base of the distributor for regulating the air-current to suit the material. Upon the outside of the tube are fixed three or more pins, which slide in a spiral groove or recess, *e*, cut in a metal ring fixed to the pans, which enables the tubes to be raised or lowered by turning it round, thus contracting or enlarging the orifice to the central air-chamber.

The lighter and less perfectly cleaned matters winnowed out from the first shower float along with the air-current toward the central air-chamber, *s*, and some are deposited in transit in the annular trays or compartments *f* and *g*, according to their specific gravity. Only the lightest and least valuable portion of these matters passes with the current into the central chamber, *s*; thence through the fan, &c., to a store-room, where it is collected.

The heavier matters fall through the outer compartment, *h*, into the hopper *i* of the strays, which feeds them upon the second distributor,

*j*, which throws them into a second shower, through which a second current of air is drawn in opposition to the shower, and a further portion of light and less perfectly cleaned matters is winnowed out, and a portion is deposited, in transit to the center, in similar annular trays or compartments to those of the first stage. The heavier matters are again allowed to descend, and in this way, through several stages, at the last of which any remaining impurities are winnowed out, and the cleaned and more valuable refuse matters are deposited in one or more pans, *K'*, *K''*, *K'''*, provided at the bottom of the machine, according to their specific gravity.

The means for regulating the currents of air, as shown in detail, Fig. 7, are the same for all cleaning-stages. The belts for adjusting the height of the sides of the annular trays may be made to be lifted and lowered in various ways, one method of which is shown at *m*, Fig. 1, the bottom edge being formed in a series of inclines, all of the same level, which rest or slide upon pins *n*, placed upon the same level, when, in moving round the belt, the inclined edges of the belt, sliding on the pins *n*, cause the belt *m* to be raised or lowered. The sweepers *o*, attached to the base of each distributor and rotating with it, sweep the contents of the annular compartments or trays to the spouts *p p*, which discharge the several matters from the machine. A valve, *r*, placed in the passage *Q*, leading to the fan and the central air-chamber, *s*, regulates the current of air.

In the machine shown in Fig. 3 the annular compartment of each set of trays is arranged for the collection of the heavier matters. The sized matter is fed, as before, into the top hopper, *a*, the mouth of which is regulated as before, or by means of a screwed mouth-piece. (Shown in detail at Fig. 10.) A hand-wheel, *t*, being cast with the screwed nozzle of the hopper, enables the feed to be regulated upon the first distributor, *c*, which in rotating throws the falling material into a shower or thin stream, which is opposed by a current of air drawn toward the central chamber at *d*, as before described; but the heavier matters drop into the outer compartment, *f*, Fig. 3, and are delivered from the machine by spout *f'*, Fig. 4.

The lighter and less perfectly cleaned matters winnowed out at this stage by the current of air fall according to their specific gravity; the heaviest portion of these into the compartment *x*, Fig. 3, thence to the hopper *i* and second distributor. Another and still lighter portion falls into the tray *g*, having a spout, *x''*, Fig. 4, for its delivery, while the third, or lightest and least valuable, portion is suspended in the air and floats with it to the central air-chamber. The shower thrown by the second distributor is again acted on by a current of air in a similar manner, so that the heaviest matters are collected or retained in the annular tray or compartment *f*, as in the first stage.

The more valuable of the less perfectly cleaned light matters fall into the hopper *i* below, to be again and again distributed and cleaned until all the more valuable or heavier matters are obtained therefrom in the outer annular compartment at each stage.

In this machine the fan or exhauster 1 is shown to be operated with the central shaft of the machine. The blades of the fanner are inclined toward the axis of the shaft, or in the form of a helix. When a stronger current of air is required for coarser material the fanner may be loose upon the central shaft, and revolve at a much higher speed by driving it with a separate belt or pulley, as will be easily understood.

We do not limit ourselves to the form of distributor of which several kinds are shown in Figs. 6, 7, 8, and 9; but we prefer, in practice, to use the distributor formed with a curved exterior, shaped to a cycloidal curve for material of larger size, and to a parabolic curve for that of smaller size, or any approximation to these curves. Sometimes we form a flat ledge, *w*, Fig. 3, in combination with such a curved outer surface, on which the material may fall and distribute itself upon the curved slope of the distributor.

We claim—

1. The combination of hopped pans provided with collecting trays or compartments, arranged concentrically tier upon tier, and so that the central compartment or chamber of each tray forms part of an air-shaft open to each tier and common to the entire series of tiers, substantially as hereinbefore described and shown, for the purpose specified.

2. In combination with the hopped pans with collecting-trays, compartments, and air-chamber, the central spindle with its distrib-

uters constructed to admit of the passage of air and other matters floating with the air through said distributors, the whole arranged and operating as hereinbefore described and shown, for the purpose specified.

3. The combination of hopped pans, collecting-trays, compartments, air-chamber, central spindle, distributors, and means whereby currents of air are caused to flow centripetally all into one central air-shaft (in which they combine) and between the said hopped pans and collecting-trays, and said distributors, so as to pass through and in opposition to the showers of material thrown out centrifugally by said distributors, substantially as described and shown, for the purpose specified.

4. The combination of hopped pans, air-chamber, and collecting-trays, central spindle, and distributors, with air-passages through them, and with an exterior slope shaped to a parabolic or cycloidal curve, or approximating thereto, down which slope material falls, and from which it is thrown by the rotating distributors into suitable showers, substantially as described, for the purpose specified.

5. In combination with the hopped pans, collecting-trays, central spindle, and its distributors, central air-shaft, a fan or exhauster arranged on said spindle, and driven thereby or thereon, substantially as described, for the purpose specified.

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