

## New Inventions.

## Locomotive Spark Arrester.

Edmond Mahony, of Pittsburg, Pa., has invented and made arrangements to secure a patent upon an improved spark arrester, or locomotive smoke stack. The improvement is the construction of a stack, by placing in the upper part of the chimney an inverted cone, within the top of the smoke and steam pipe, which is expanded into an inverted frustum. The base of said cone is also connected with a deflector formed by a frustum of greater inclination, by the action of which the sparks are thrown against the sides of the chimney, whence they are washed away by the steam. Upon the deflector above-mentioned is placed a cone, with elliptic sides, the apex of which projects above the top of the chimney. By this arrangement the inventor claims a great increase in the draught of the fire, which object is further sought to be obtained by the employment of a flaring ring surrounding and near the top of the chimney, within which the current of air generated by the motion of the locomotive will rise and aid the escaping smoke in its ascent. The inventor also claims that the peculiar arrangement of the inverted cones will, to some extent, obviate the disagreeable noise common to all high-pressure engines, and, by the increased draught, will save two-thirds the fuel, and, at the same time, increase the power. If so, this is one of the most valuable inventions we have noticed for some time.

## Improved Root Cleaner.

J. H. Fairchild and S. Richardson, of Jericho, Vt., have applied for a patent upon an improved root cleaner. The machine consists of two inclined revolving cylinders, the one within the other, the outer being solid and the inner slatted. Between the two there is a spiral slat so constructed that the dirt will, by the revolution of the cylinders, be collected, carried forward to one end of the machine, and discharged separately from the roots.

## Improved Grain Winnowing Machines.

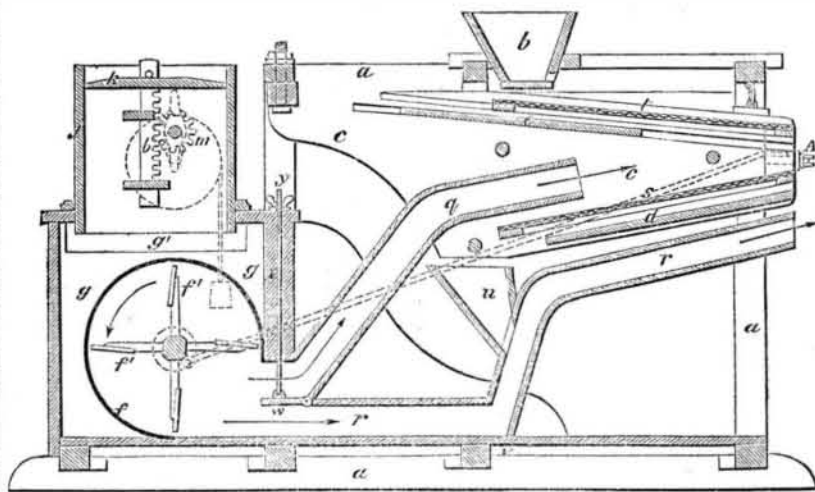
The annexed engraving is a central longitudinal section of a grain winnowing machine, for which a patent was granted to Samuel Canby, of Ellicott's Mills, Md., on the 28th of last Dec. The object of this improvement in such machines is the adjustment of the blast of air to the shoe of the fanning mill, so as to save the grain and not have it blown away by its accidental discharge along with the lighter refuse, whenever the blast is in excess of its ordinary rate, by an increase of velocity. There is also a device placed under the control of the operator, which enables him to vary the distribution of the blast to different portions of the apparatus, according to the nature of the grain to be cleaned; the arrows show the direction of the current of air.

*a* is the frame; *b* is the hopper; *c* is the shaking shoe; *d* is the conducting board.—These parts do not differ materially from those in use; *e* is an adjustable conducting shelf beneath the riddle, *t*, by means of which the grain, when light and dry, is delivered from the riddle on the screen near the rear end thereof, to prevent the grain being carried off with the light matter, and when the grain is damp or otherwise heavy, so as to require a great amount of winnowing action, it is delivered on the screen, *s*, near the front end thereof. This is done by drawing the board, *e*, in or out. The shoe, *c*, is hung to the frame in the usual manner, and is vibrated by means of a bell-crank attached to a rod (not seen) connected to the fan shaft. The fan case, *f*, is enclosed in a chest, *g*. This chest serves as a channel to conduct the air to the fan, *f'*, from valve boxes which are furnished with butterfly valves. The two valve boxes are placed one on each side of a larger one, *j*, which is like them, open below the chest, *g*. In said box is a piston, *k*, whose rod, *h*, has a rack on one side, into which gears a pinion, *m*, whose shaft is identical with that of the butterfly valves. This shaft extends at one end outside of the valve box, and has a pulley on it over which hangs a cord having a weight hung upon it. This pulley is so arranged with a slot in its side, as to be set eccentrically so as

to increase at pleasure the leverage of the weight. In either end of the chest, *g*, above the drum or fan case, *f*, there is an opening, *g'*, which communicates through end chambers, *g''*, with the open ends of the fan case. The action of the weight spoken of on the eccentric pulley,

holds the valves open by ordinary velocity, but when the fan has been revolved with a rapidity that will cause a partial vacuum in the chest, *g*, it is evident that the piston, *k*, will be forced down in its box, *j*, to a distance depending on the relative forces derived from the suction of

## CANBY'S GRAIN WINNOWER.—Number 1.

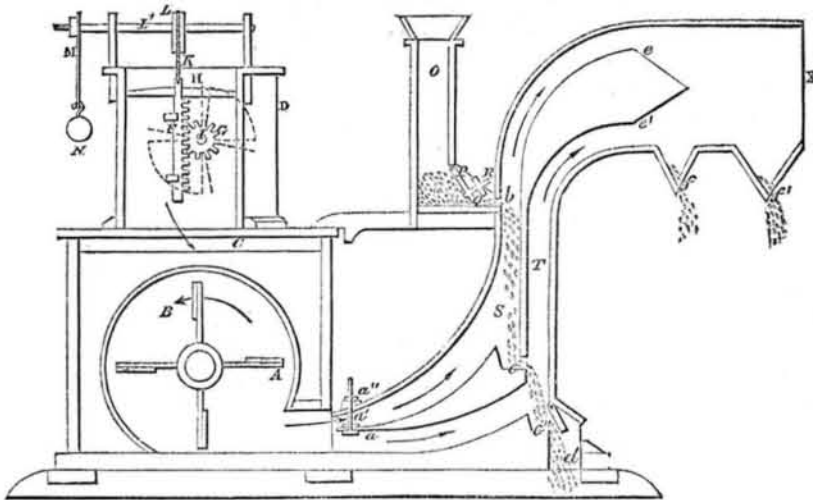


the fan and pressure of the atmosphere upon the piston, *k*, on the one hand, and the resisting weight upon the other, which increases as the weight is lifted, so that should the speed of the fan decrease, the tendency of the weight is to cause it to ascend. The action of piston, *k*, therefore, governs that of the butterfly valves in opening and closing the area of the boxes in which they are placed, and consequently regulating the admission of the air to the air chest, *g*. By a proper arrangement of the eccentric pulley spoken of, the butterfly valves can be rendered very sensitive to regulate the blast.

From the fan case, two spouts, *q* *r*, proceed, the one, *q*, leading up between the screen, *S*, and the riddle, *t*, of the shoe, so as to direct the blast centrally between the two, and the spout,

*r*, taking a lower course and discharging below the shoe. The object of spout, *q*, is to direct the blast from the fan, so as to carry off the main bulk of the cheat and other light matter, from the descending grain at the front of the shoe. The grain descending from the lower edge of the screen into the hopper, *u*, passes into the spout, *r*, and escapes through the aperture, *v*, in the floor. In its descent through the escaping blast of the spout, *r*, the said blast carries up all the lighter particles and discharges them at the forward extremity of the spout.—To adjust the force of the blast in either spout, there is a flap valve, *W*, hinged at the joining line of the spouts and fan cases which is operated by a rod, *X*, having a screw, *Y*, for working it.

## CANBY'S GRAIN WINNOWER.—Number 2.



The annexed engraving is a longitudinal vertical section of a Grain Winnower, for which a patent was granted to the same inventor, Samuel Canby, on the 9th of last month, (August.) The first part of the improvement is similar in some respects to the one embraced in the foregoing illustration and description, and consists in constructing above the fan chamber and the opening into it, a regulator, consisting of three apartments, the sides of the exterior containing openings for the admission of the air, the central apartment being furnished with a piston suspended by a cord passing over an exterior pulley and balanced by a weight at the extremity of a lever attached to the shaft of the suspending pulley; the underside of the piston being attached to a rack rod meshing into a pinion upon a shaft extending across the three apartments, and thus operating two valves in the exterior chambers, and upon the same shaft as the pinion, so that the accurately balanced piston, shall open the air passages as the blast is weakened, or diminish their extent when the blast becomes too strong. The second part of the invention consists in arranging, in the front part of the hopper, a swinging door which shall cause the grain to distribute itself evenly over the bottom of the hopper before raising the door and passing out, thereby causing the grain to flow in a

uniform current into the first blast channel.—The third part of the invention consists in passing the blast through two channels, so arranged that the uniform current of grain entering the first, shall, after being acted upon by the blast, pass steadily into the second blast, where the cleaning is completed. The amount of blast into the several chambers is regulated by a swinging door at the entrance of the channels, so as to divide the blast according to the required amount of air for each channel. *A* is the fan made to revolve in chamber, *B*, air being admitted through the passages, *C*, at the ends of the chamber, which passages communicate with the interior of the regulator, *D*. This regulator consists of three apartments, (the figure being taken through the central one, the two side ones are not shown.) In the apartments—one on each side of *D*—there is an opening in their sides through which air passes to the fan. In the central apartment is the piston, *H*, suspended by the cord, *K*, passed over the pulley, *L*. On the underside of the piston, *H*, is the rack-rod, *F*, which meshes into the pinion, *G*, upon shaft *I*. On the shaft close to the sides of the side chambers are valves which can be made by the revolution of the shaft, *I*, to cover the side openings altogether or partially. The arrangement of suspending the piston, *H*, and having it

balanced by a weight, *N*, sufficient for the strength of the blast required, renders said piston extremely sensitive to the least variation of the blast, causing it to regulate the supply of air in a very desirable manner.

*O* is the hopper having a swinging door, *P*, upon the exterior of which is the screw, *Q*, and weight, *R*, movable upon it. The object of this arrangement is to confine the grain when thrown in the hopper until it has spread evenly over the bottom, when it will gradually raise the door, *P*, and pass out in a uniform current.—The weight, *R*, regulates the resistance to the weight of the grain. The winnowing portion of the machine is divided into two channels, *S*, and *T*, the amount of blast to be thrown into each being regulated by the swinging valve, *a*, which is operated by the screw, *a'*, and the nut, *a''*.

OPERATION.—The weight, *N*, is first regulated to the amount of blast required, and the one *R*, is also adjusted to the weight of the grain in the hopper, besides which the valve, *a*, is arranged so as to divide the blast according to the nature of the grain. After these preliminary adjustments, the machine is set in motion and the grain is thrown into the hopper, *O*, the door, *P*, will prevent its sudden rush out, and cause it to spread evenly, over the bottom of the hopper, forcing up the door gradually, when it will descend uniformly through the aperture, *b*, into the passage, *S*, where it meets the first blast, which passing through the uniform stream of grain, carries off the light impurities, allowing the grain to fall upon the shelf, *c*, whence it passes in a regular stream into the channel, *T*, receives the second blast, which drives off in the direction of arrow, whatever light substance it may then contain, the grain falling completely cleaned, on the shelf, *c'*, whence it passes through the opening, *d*. After this separation has taken place, and the light substances are blown off in the direction of the arrows, the full force of the blast is felt until the points, *e*, and *e'*, of the channels, *S* and *T* are reached, when by reason of the widening of the mouth of the spout, the blast is weakened, which causes the heavier particles to fall through the openings, *f*, *f'* and the lighter passes out of the mouth, *X*.

REGULATOR.—The air passes through the openings, *F* and *C*, to the fan, *A*, which, as it revolves, creates a partial vacuum in the central chamber, *D*, giving the piston, *H*, a tendency to descend because of the atmospheric pressure on its outer surface; this inclination is counteracted within the proper limit by the weight, *N*; but when the blast becomes too great by an increase of the fan's velocity, the vacuum below the piston becomes more perfect, which causes the pressure on the outside surface of the piston, *H*, to overcome the gravity of *N*, and depress the piston; this actuates the pinion shaft, *I*, and moves the valves which regulate the blast into the openings of the side chambers as described before, so as to admit no more air than is requisite to regulate the proper and uniform amount, thus the equilibrium of the blast is maintained under different velocities of the fan, a very important regulation, especially when animal power is employed to drive the machine. When the fan moves slowly, the upper surface of the piston is relieved from pressure, which allows it to rise, and thereby the inlet passages are opened fully to admit a blast that does not expand when it gets inside of the machine. The weight, *N*, is variable for regulating the strength of the blast for different kinds of grain, and for the perfect regulation of the machine, so as to let none of the grain pass out with the lighter matters at spout, *X*. The shelf, *c'*, causes the grain to bank open the valve, so that air is prevented from passing out with the cleaned grain. The claim for this improvement is as follows: "the construction of the receiving and discharging passages for the grain, that is the passages at door, *H*, passages, *c* and passages *c'*, in the manner and for the purpose set forth." The regulating of the blast by the operation of the piston, *H*, opening and closing the inlet passages according to the velocity of the fan is embraced in Mr. Canby's first patent.—By the two improvements a very perfect winnower is thus produced.

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