

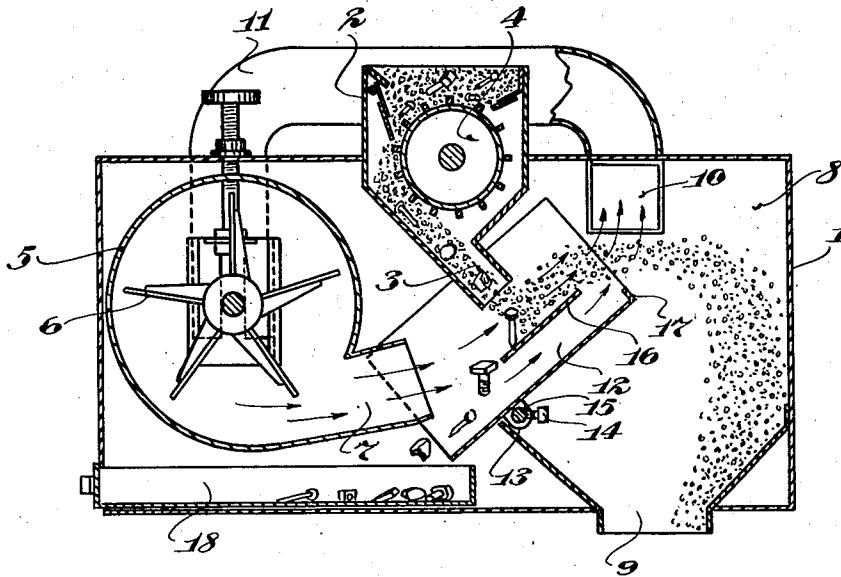
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MEANS FOR SEPARATING MATERIALS OF DIFFERENT SPECIFIC GRAVITY

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MEANS FOR SEPARATING MATERIALS OF
DIFFERENT SPECIFIC GRAVITYAndrew E. Rothgarn, Minneapolis, Minn., as-
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11 Claims. (Cl. 209—136)

My present invention provides a machine or apparatus capable of a wide range of usage for the separation of relatively heavy and relatively non-resilient foreign material, such as stones, nails and other metallic objects, from relatively light much more resilient stock such as corn or other grain. By proper adjustments of the co-acting elements, the machine can be used to remove articles such as hulled corn from lighter grain such as oats or wheat.

Generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

My invention takes advantage of the fact that relatively heavy materials such as stones and metal articles have such a slight degree of resilience that they will, when projected against a hard surface such as an impact plate, rebound very slightly, if at all, while resilient material such as corn and other grain kernels, will rebound to a very considerable extent. By properly combining a feed device, a blower and a deflector having a properly arranged impact plate, separations of relatively hard and non-resilient materials from relatively resilient materials may, as I have found in practice, be very effectually accomplished.

The invention is illustrated in the single view of drawing which is a vertical longitudinal section through the machine, some parts thereof being broken away.

The machine illustrated comprises a main casing 1 which, as shown, is a rectangular sheet metal shell. Located in and extended through the top of the casing, in the central portion thereof, is a feed hopper 2 provided with an oblique discharge spout 3. Any suitable feed-regulating mechanism may be employed in this hopper, but as shown, it comprises a power-driven feed cylinder 4. Located in one end of the casing 1 is a fan casing 5 and a fan head 6, which latter will be power-driven in the usual or any suitable way, but rotated in a counter-clockwise direction in respect to the drawing. The fan casing 5 has a tangential air discharge spout 7 that opens below the hopper 2. In the opposite end of the casing 1, to wit: that end remote from the end in which the fan casing 5 is located, there is provided a settling chamber 8 with a hopper-like bottom leading to a discharge spout 9. The upper portion of this settling chamber 8 is provided with an air outlet port 10 that is connected by an air pipe 11 to the inlet of the fan casing 5.

Located between the discharge spouts 7 of the

fan casing and the settling chamber 8, is a deflector of novel construction and in novel relative arrangement to the other parts noted. This deflector, as shown and as preferably designed, is in the form of a trough 12 formed of metal or other material. This trough-like structure 12, as shown, is provided on its bottom with lugs 13 adjustably secured by a set screw 14 or the like to a cross shaft 15 that is fixed to the sides of the casing 1. Within the trough-like deflector 12 is an impact plate 16. This plate 16, which is preferably of heavy sheet steel, is spaced a considerable distance above but approximately parallel to the inclined bottom of the trough 12.

This impact plate 16 terminates very far short of the lower end of the trough and a considerable distance short of the upper end of said trough, but is so positioned that all but the very light materials discharged from the hopper spout 3 will fall against the same. The bottom of the trough 12 at its extreme upper end is formed with a raised flange 17 for a somewhat minor yet important reason presently to be noted.

For illustration, it will first be assumed that the machine is to be used to remove nails, stones and all such heavy and relatively non-resilient foreign articles from a relatively light and resilient stock such as corn, commingled with other grains. When the machine is in action, these commingled materials will fall from the spout 3 through the air blast from the blower. All of the heavy and relatively non-resilient articles such as the stones, nails or the like, on striking the inclined impact plate 16, will, under the action of gravity, simply slide down the same and out of the lower end of the trough 12 and into some suitable receptacle such as the removable drawer 18. Relatively resilient materials such as corn, on striking the impact plate 16, will rebound to a considerable extent, and will be picked up by the air blast and be carried into the upper portion of the settling chamber 8. Some of the lighter materials will be blown directly into the settling chamber without coming into contact with the plate 16. Some objects such as the lighter stone or pieces of wood or the like may be caught by the air blast and carried over the upper edge of the plate 16, but will slide back into the channel formed between the said plate 16 and the bottom of the trough 12, and from thence will slide back into the receptacle 18. Here it will be noted that the strongest part of the blast from the blower will be directed above the plate 16. However, there will be enough of an air blast forced up over the bottom of said

trough to prevent the lighter materials from dropping back into the trough. The flange 17 will catch and hold some foreign materials that might be carried over into the chamber 8 directly from the plate 16.

Attention is called to the fact that the greater the pitch at which the trough 12 and plate 16 are set, the greater will be the tendency to take relatively non-resilient and heavy materials from the lighter and more resilient particles of the stock and conversely, the less the pitch in said trough and plate, the less will be the tendency to take heavier and relatively non-resilient articles from the main stock. Hence, by proper adjustments of the above described deflector, the machine may be adjusted for separating materials that differ by various degrees in resilience and specific gravity. For example, the machine can be adjusted to remove corn from oats and other relatively light grains.

The machine has, in practice, been found efficient for the purposes had in view. From what has been said, it will be understood that the said machine is capable of various modifications as to details of construction and arrangement of parts herein disclosed and claimed.

What I claim is:

1. In a device of the kind described, a settling chamber, a blower for directing a blast toward said settling chamber, an inclined deflector in the line of the blast from said blower to said settling chamber, and means for feeding commingled stock through said blast and onto said deflector, said deflector being open at its lower end for the discharge of relatively non-resilient and relatively heavy articles and being open at its upper end for the discharge of lighter and more resilient articles, said deflector having an impact plate that is spaced above and is approximately parallel to but terminated short of both ends of the bottom of said deflector.

2. In a device of the kind described, a settling chamber, a blower for directing a blast toward said settling chamber, an inclined deflector in the line of the blast from said blower to said settling chamber, and means for feeding commingled stock through said blast and onto said deflector, said deflector being open at its lower end for the discharge of relatively non-resilient and relatively heavy articles and being open at its upper end for the discharge of lighter and more resilient articles, said deflector being inclined in a direction reverse to the travel of the air therethrough, said deflector having an impact plate that is spaced above and is approximately parallel to but terminated short of both ends of the bottom of said deflector.

3. The structure defined in claim 2 in which the inclined bottom of said deflector at its upper edge has a raised intercepting flange.

4. In a device of the kind described, a settling

chamber, a blower for directing a blast toward said settling chamber, an inclined deflector in the line of the blast from said blower to said settling chamber, and means for feeding commingled stock through said blast and onto said deflector, said deflector being open at its lower end for the discharge of relatively non-resilient and relatively heavy articles and being open at its upper end for the discharge of lighter and more resilient articles, said deflector having an impact plate that is spaced above and is approximately parallel to but terminated short of both ends of the bottom of said deflector, said deflector and its impact plate being adjustable to vary the angles thereof in respect to a horizontal.

5. In a separator of the kind described, an inclined deflector having an impact plate set above and spaced from the inclined bottom thereof in the same direction of inclination, means for delivering material to be separated downwardly onto said impact plate, and means for producing a forced circulation of air upwardly in part above said impact plate and through the material and in part through the passage between said impact plate and the bottom of said deflector.

6. The structure defined in claim 5 in which the lower edge of said impact plate is located above the lower edge of the bottom of said deflector.

7. The structure defined in claim 5 in which the upper edge of said impact plate is terminated short of the upper edge of the bottom of said deflector.

8. The structure defined in claim 5 in which the lower edge of said impact plate is located above the lower edge of the bottom of said deflector and the upper edge of said impact plate is terminated short of the upper edge of the bottom of said deflector.

9. In an apparatus for the separation of articles differing in specific gravity and/or resilience, an inclined deflector having an impact plate set above and spaced from the inclined bottom thereof in the same direction of inclination, so as to afford a passage between said impact plate and the bottom of said deflector, means for delivering material to be separated onto said impact plate, and means for producing a forced circulation of air upwardly through the material delivered onto said impact plate.

10. The structure defined in claim 9 in which the upper edge of said impact plate terminates short of the upper edge of the bottom of said deflector.

11. The structure defined in claim 9 in which the upper edge of said impact plate terminates short of the upper edge of the bottom of said deflector, and in which the lower edge of said impact plate terminates short of the lower edge of the bottom of said deflector.

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