

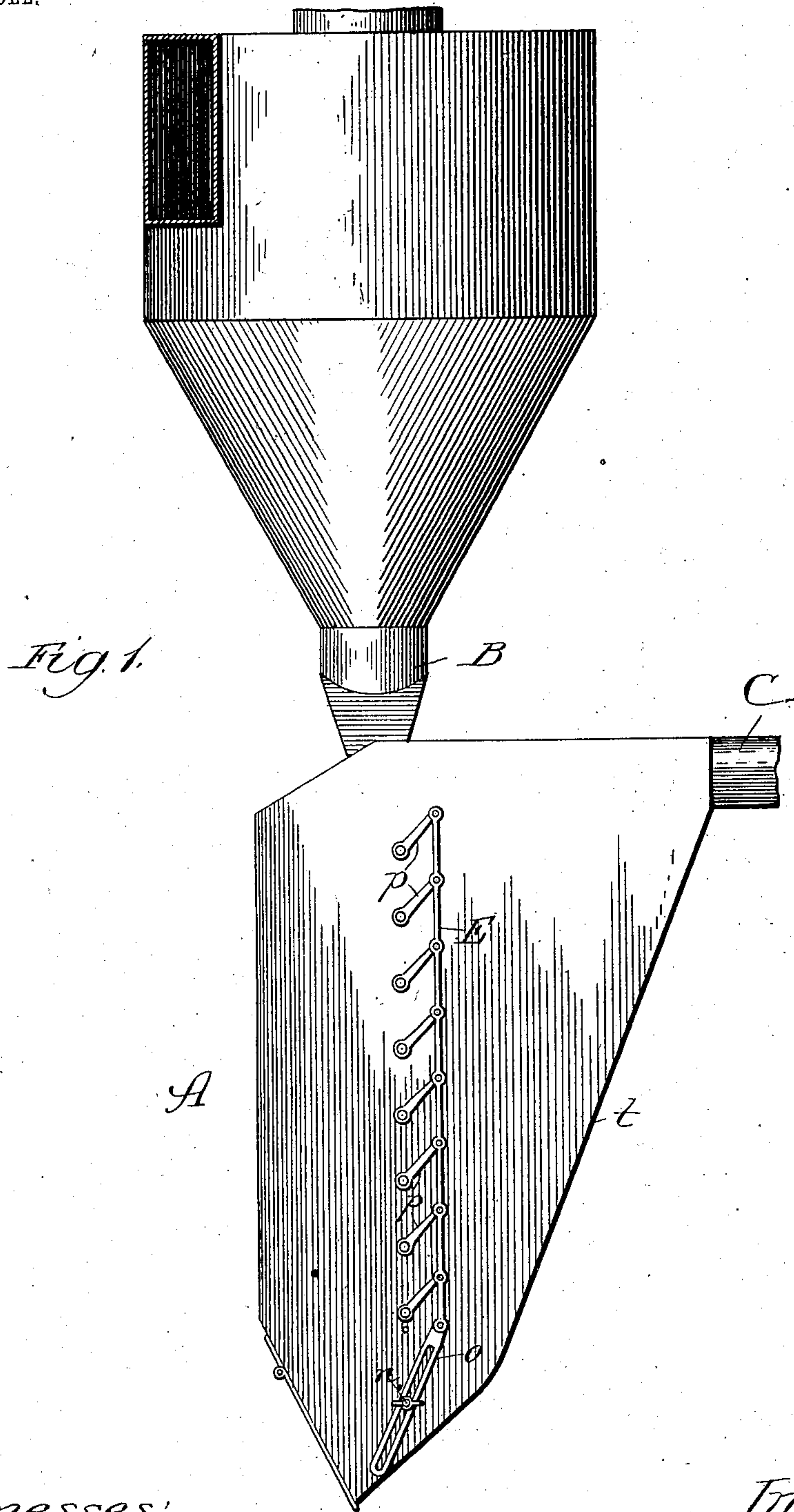
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PATENTED DEC. 8, 1903.

A. N. DODGE.
SCREENING SEPARATOR.
APPLICATION FILED JUNE 22, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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UNITED STATES PATENT OFFICE.

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SCREENING-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 746,302, dated December 8, 1903.

Application filed June 22, 1903. Serial No. 162,546. (No model.)

To all whom it may concern:

Be it known that I, ALBERT N. DODGE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Screening-Separators, of which the following is a specification.

My invention relates to a device intended, primarily, as an attachment to cyclone dust-collectors in grain-elevators for rehandling the precipitated dust to separate therefrom the more or less nutritious constituents, technically known as "screenings," which are marketable as feed. As will be explained later, however, the device is capable of useful application independently of any initial separator and to substances other than the cereals. Therefore, while the description which follows relates in the main to the application of the device as an adjunct to a cyclone dust-collector for the further separation of cereal-screenings, this is not intended as a limitation.

Cyclone dust-collectors are in common use in grain-elevators, and it is usual to convey the precipitated dust to the furnaces and utilize it as fuel, since it is highly combustible. Portions of the precipitated matter, however, are ordinarily more valuable than coal, and the primary object of my invention is to separate these portions from the rest. A further object of my invention is to vary the degree of this separation according to the relative values of fuel and animal feed. Owing to the fluctuation of these values it is at times profitable to market screenings which are of a quality that could not be profitably marketed or which could be more profitably burned at other times.

My invention will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a separator constructed in accordance with my invention in coöperative relation to the dust-outlet of a cyclone dust-collector. Fig. 2 is a vertical section on the line 2 of Fig. 3, showing the internal mechanism; and Fig. 3 is an ir-

regular sectional plan view on the line 3 of Fig. 2.

A represents the casing, having by preference the general configuration shown in Figs. 1 and 2—viz., with one side vertical and the opposite side inclined to a hopper shape. At the upper end of the casing A is the outlet B of a cyclone dust-collector, through which the mixed screenings and dust enter the separator. If used without a cyclone dust-collector, the part B would ordinarily take the form of a hopper. At the upper corner of the casing A on the rear side thereof, and hence at the upper end of the inclined wall *t*, is formed the opening C, to which an air suction-pipe (not shown) is connected. The lower end of the casing in which the separated screenings collect may be open, but is preferably provided with a door or other means for closing it in such a manner that from time to time the accumulated screenings may be removed.

Arranged in vertical series within the casing A below the inlet B are shelves D. These shelves D must be capable of adjustment to variable inclinations, and to this end each shelf is supported on a bar *s*, terminating at its opposite ends in trunnions *r r'*. To the trunnion *r* of each shelf is connected a crank *p*, and the several cranks *p* are connected to the common adjusting-rod E. The lower end of the rod E is provided with the slotted arm *o*, through which a thumb-nut *n* passes, by means of which the arm *o*, and hence the rod E, may be secured in its adjusted position. It will be seen that by lifting or lowering the rod E the inclination of the shelves D may be changed.

Through the front wall of the casing A openings *m* are formed opposite the spaces between the shelves, and these openings are preferably provided with shields *l* to deflect the entering air. In the upper part of the casing A is provided the curved shield F, the purpose of which is, in coöperation with the uppermost shelf, to prevent the direct travel of air or dust from the inlet B to the outlet C. So much of the casing A as is not required to receive the shelves D constitutes a supplemental compartment G, in which the

dust carried from the shelves to the outlet C is in a state of relative, and, owing to the inclined rear wall *t*, graduated expansion, whereby any particles of screenings still contained in the dust more readily separate themselves by gravity and fall to the bottom of the casing.

The operation is as follows: Air-suction being applied, a current is formed passing from each of the openings *m* to the outlet C. The dust carrying the screenings is then admitted through the inlet B, whence it falls upon the uppermost shelf D. As the material enters it passes continuously down the inclined shelf uppermost of the series, and in its further downward course after leaving that shelf it is forced by the currents of air entering the various openings *m* between the adjacent shelves D toward the outlet C. In the passage between shelves the tendency of the dust is to impinge against the lower surface of the upper one, and the effect of this is to aid in the separation of heavier particles still carried in the dust, causing them to fall upon the surface of the plate below and eventually pass off.

The amount of inclination which should be given to the shelves D is subject to variation according to the nature of the dust to be treated and according to the percentage of the screenings which it is deemed profitable to save. Thus if a very high degree of separation is desired the inclination of the shelves is made only sufficient to permit the dust to flow down freely. In this position the air has a nearly direct passage between the shelves to the outlet and is able to act with such force upon the dust that only the heaviest constituents escape it and fall to the bottom. On the other hand, if a lower degree of separation is desired the shelves are adjusted with greater inclination from the horizontal. In this position the air is compelled to follow a more indirect and obstructed course through the shelves, with the result that lighter constituents separate and fall by gravity. Between the extremes of approximately horizontal and approximately vertical adjustment any desired degree of separation may be obtained. By means of the adjustable feature of the shelves, moreover, the dust may be either wholly saved or wholly carried to the furnace, as desired. For saving all the dust the shelves are so adjusted as to be substantially vertical, which brings the rear edge *h* of the top shelf in line with the rear edge *i* of the dust-inlet and converts the shelves into a vertical partition, causing all the entering dust to fall directly to the bottom. For diverting all the dust to the furnace the shelves are so adjusted as to bring the forward edge *h* of the top shelf against the forward edge *g* of the dust-inlet, which occurs when the rear edge *f* of the lowermost shelf meets the stop *e* on the rear wall. The flow of dust is then almost directly toward the outlet C, as are

also all the air-currents, and thus substantially everything is carried off through that outlet.

It is advantageous to employ the swinging gravity-door *d*, suspended from a shaft *c* just below the lowermost shelf. This door operates to prevent a current of air below that shelf toward the supplemental compartment G and to cause the periodical discharge of the screenings which collect in the lower part of that compartment.

Throughout this specification I have described the air movement as due to suction; but it will be understood that instead of withdrawing the air through the opening C it may be forced through the openings *m*, if desired.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a screening-separator, the combination with the casing A having at its upper end an inlet for the material to be treated, at its lower end a discharge-opening therefor, at its upper rear side an air-exhaust opening and at its front side air-inlet openings, of a vertically-disposed series of shelves D pivoted within the casing, and a shield F in coöperation to the uppermost shelf, whereby the entering material may be wholly saved or wholly carried off, or subjected to different degrees of separation, substantially as described.

2. A screening-separator, comprising a casing A having an inlet B at its upper end for the material to be treated, an outlet therefor at its lower end, an air-outlet C in one side and air-admitting ports in its opposite side, in combination with the shield F near its upper end, the vertically-disposed series of pivoted shelves D arranged below the inlet B and forming the supplemental compartment G within the casing, and mechanism for adjusting the shelves simultaneously to different angles and for securing them in their adjusted position, substantially as described.

3. In a screening-separator, the casing A having an inlet B at its upper end for the material to be treated, an outlet therefor at its lower end, and an inclined side *t* provided with the air-outlet C, and having in its opposite side air-admitting ports *m*, in combination with the curved shield F, extending downward and backward from the rear of the dust-inlet, a vertically-disposed series of shelves D, pivotally mounted in the casing, and mechanism for adjusting the shelves simultaneously to different angles and for securing them in their adjusted position, substantially as described.

4. In a screening-separator, the casing A having an inlet B at its upper end for the material to be treated, an outlet therefor at its lower end, and having an inclined side *t* provided with an air-outlet C and a shoulder *l*, and having in its opposite side air-admitting ports *m*, in combination with the curved shield F extending downward and backward from the rear of the dust-inlet, a vertically-dis-

posed series of shelves D forming, with the inclined side *t*, the supplemental compartment G, and pivotally mounted in the casing on trunnions projecting through the casing
5 on one side, cranks on the projecting ends, a vertical bar E connected to the cranks and operating to turn them simultaneously, and

means for locking the bar E in position, substantially as described.

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In presence of—

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