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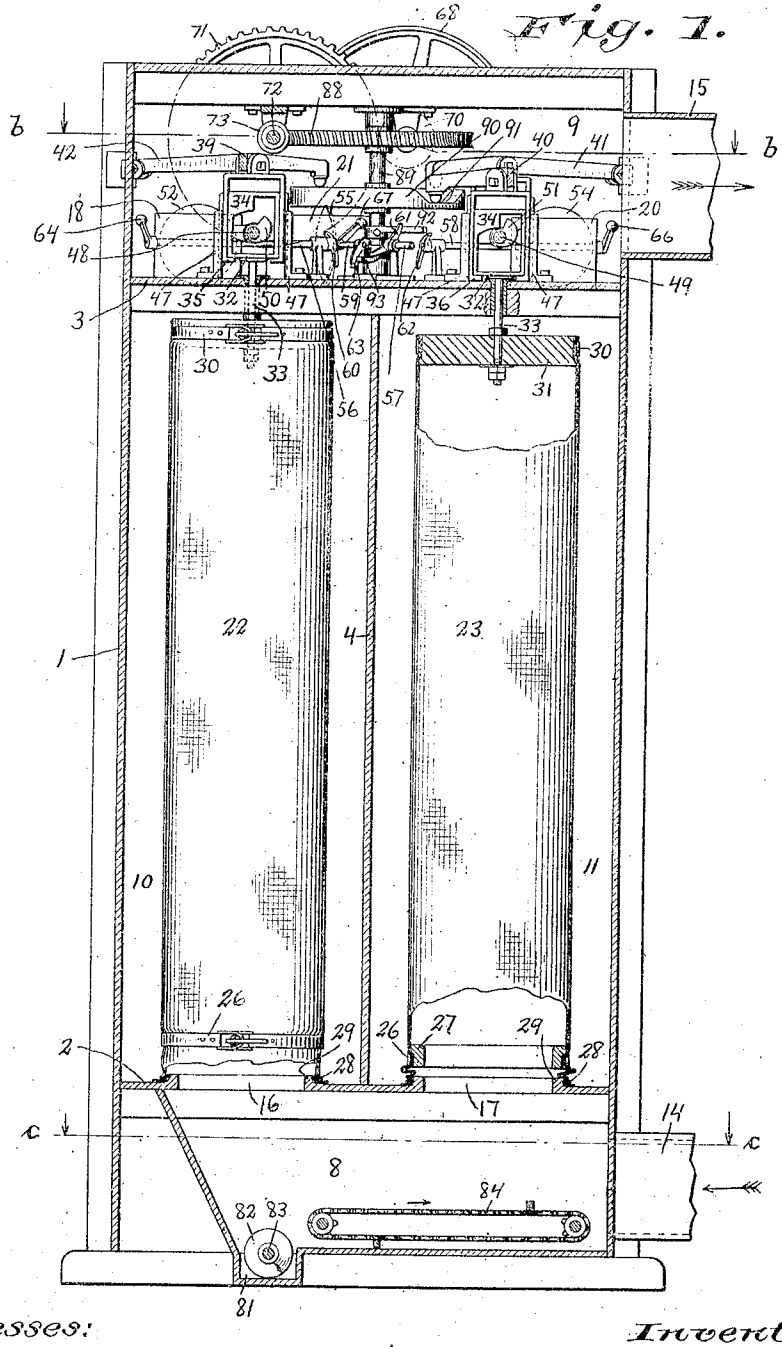
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1,086,477.

Patented Feb. 10, 1914.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

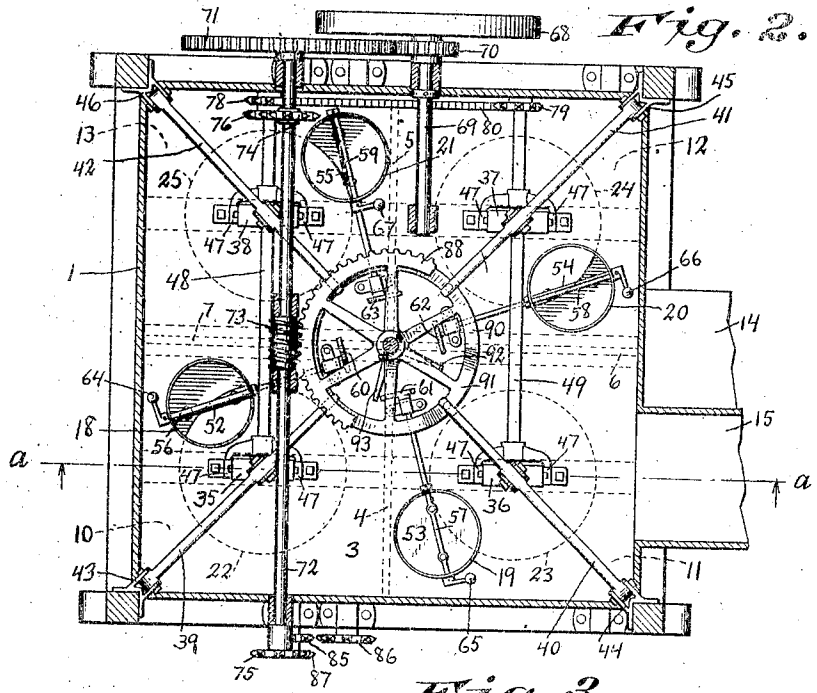
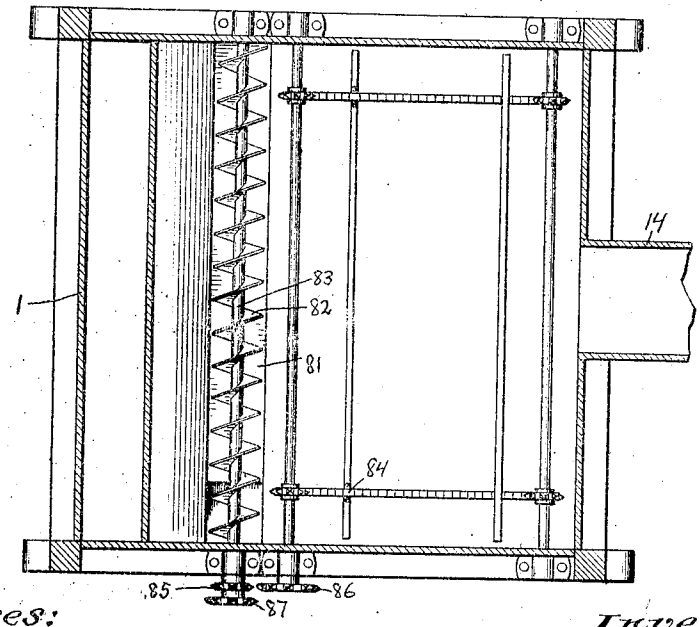


Fig. 3.



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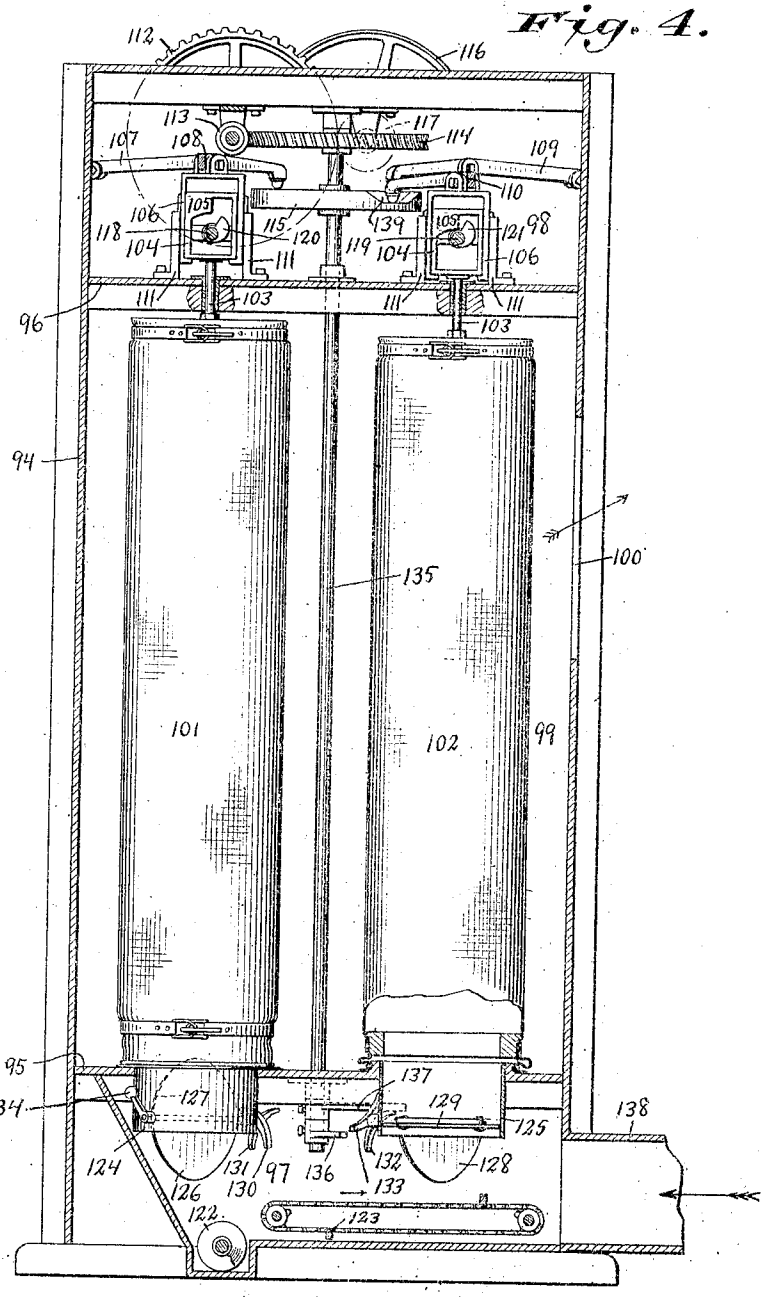
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3 SHEETS—SHEET 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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1,086,477. Specification of Letters Patent. **Patented Feb. 10, 1914.**

Application filed March 5, 1913. Serial No. 751,997.

To all whom it may concern:

Be it known that I, HERMAN CARL STAHN, a subject of the Emperor of Germany, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Separators, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

This invention relates to separators for separating dust and fine particles from an air current and the objects of the invention are to improve such separators in the manner to be hereinafter more specifically described and claimed.

Air currents are commonly utilized for taking up and conveying dust and particles away from places where their presence is objectionable and before releasing the air from the pipes or conduits in which it is confined it is frequently desirable to pass the commingled air and particles through some form of separator to save the particles or to prevent contamination of the atmosphere.

Referring to the drawings which accompany this specification and form a part hereof, which drawings illustrate embodiments of this invention, and on which drawings the same reference characters are used to designate the same elements wherever they may appear in each of the several views, Figure 1 is an elevation in section on the line *a*—*a* on Fig. 2; Fig. 2 is a plan view in section on the line *b*—*b* on Fig. 1; Fig. 3 is a plan view in section on the line *c*—*c* on Fig. 1; and Fig. 4 is an elevation in section similar to Fig. 1 but illustrating a modified form of construction.

Referring specifically to the drawings, the reference numeral 1 designates a casing which is completely closed except as hereinafter described. The interior of the casing is divided into compartments by the horizontal partitions 2 and 3 and the vertical partitions 4, 5, 6 and 7. These compartments are designated by the reference numerals 8, 9, 10, 11, 12 and 13, respectively. In the use of the separator, the air current may be induced in any known or preferred manner but ordinarily it will be induced by a fan (not shown) and the preferred form of the separator as shown by Figs. 1, 2 and 3 of the drawings may be located either on the suction or discharge side of the fan, but preferably on the discharge side of the fan. A conduit 14 leading from the fan (not shown) communicates with the compartment 8, and, if desirable, a conduit 15 may be employed to lead the purified air to some selected place of discharge from compartment 9 instead of allowing the air to escape directly into the room or building in which the separator is located. The separating mechanism proper is located between conduits 15 and 14 and consists of the mechanism to be presently described.

Each of the compartments 10, 11, 12 and 13 is in open communication with compartment 8 through apertures in partition 2, only two of which are shown by the drawings and designated by the reference numerals 16 and 17, and also with compartment 9 through apertures in partition 3 with which the short pipes 18, 19, 20 and 21 register. Cloth or other suitable fabric bags 22, 23, 24 and 25 are located in compartments 10, 11, 12 and 13, respectively. It should be understood that the construction in this particular as illustrated and described is merely the preferred construction and not essential to the practice of the invention because more than one bag may be placed in a single compartment and the compartments for the bags may be more or less than four in number, as will be readily understood.

Each bag is secured at its lower end by a strap or equivalent means 26 to an annular weight 27 and the extreme lower ends of the bags make dust tight joints with partition 2 as, for example, by being secured by cords 28 to flanges 29. The tops of the bags are secured by straps or equivalent means 30 to imperforate or solid heads 31 which are suspended from yokes 32 by rods 33 which pass through apertures in partition 3. Each yoke 32 is provided with a cam part 34 and the yokes are respectively located within links 35, 36, 37 and 38, which links are pivoted to levers 39, 40, 41 and 42 fulcrumed on brackets 43, 44, 45 and 46. The links 35, 36, 37 and 38, when in their lowermost positions, serve as guides within which the yokes can reciprocate and the links themselves are slidable vertically within guides 47 arranged in pairs as clearly shown by the drawings.

Shafts 48 and 49 extend through the yokes and are provided with cams, a separate cam being provided for each yoke, two of which are shown by the drawings and designated by the reference numerals 50 and 51. The short pipes 18, 19, 20 and 21 are provided

with valves 52, 53, 54 and 55 on rock shafts 56, 57, 58 and 59 which carry double-ended trip-arms 60, 61, 62 and 63 and throw-over weights 64, 65, 66 and 67.

Belt pulley 68 on shaft 69 by means of pinion 70 drives spur gear 71 on shaft 72 on which are worm 73 and sprocket wheels 74 and 75. Sprocket wheel 74 drives shaft 48 by sprocket wheel 76 and sprocket chain (not shown). Shaft 49 is driven from shaft 48 by means of sprocket wheels 78 and 79 and chain 80. Compartment 8 is provided with a trough 81 in which is a screw conveyer 82 on shaft 83 for discharging accumulated material. A scraping conveyer 84 scrapes material along the bottom of compartment 8 into trough 81 and is actuated by sprocket wheels 85 and 86 and chain (not shown). Shaft 83 is driven by chain (not shown) from sprocket wheel 75 onto sprocket wheel 87.

Worm 73 drives worm wheel 88 and vertical shaft 89. Cam wheel 90 on vertical shaft 89 has a recess 91 in its upper surface and the free ends of levers 39, 40, 41 and 42 project over cam wheel 90 so that they are held in elevated positions except when permitted to drop into the recess 91. When the levers are in their elevated positions the links 35, 36, 37 and 38 are raised and elevate the yokes 32 so that their cam parts 34 are as high as they would otherwise be lifted by the cams, 50 and 51 and the other two cams (not shown) on shafts 48 and 49 so the rotation of shafts 48 and 49 does not shake the bags. When, however, a lever drops into the recess 91 the bag below that particular lever will be shaken by the rotation of the shafts 48 and 49 as will be readily understood.

The vertical shaft 89 carries two trips 92 and 93 one of which is below and the other of which is above the rock shafts 56, 57, 58 and 59, as clearly shown by Fig. 1 of the drawings, and these trips lie in different vertical planes so that one will open valves 52, 53, 54 and 55 and the other will close said valves after they have remained open the selected predetermined interval.

The operation of the separator is as follows. The belt wheel 68 is being revolved and is revolving shafts 48, 49 and 89 and conveyers 83 and 84 are in operation. Cam wheel 90, trips 92 and 93, and the bag shaking cams (50 and 51 and the two not shown) are revolving. The dust laden air is entering compartment 8 and passing into the interiors of the bags, passing through the bags (except as hereinafter described) leaving the dust and particles in the bags and escaping past the open valves in the short pipes into compartment 9 and thence through conduit 15 to the place of discharge. The bags when they are filtering the air are quiet, that is to say, they are not shaken when their particular valves are open because the lever for a particular bag is elevated when the valve controlling the passage of the air from the compartment in which that bag is located is open. Each valve is open the greater part of the time and its particular bag is quiet and filtering the air during that period. To keep the bags clean so that their meshes will not become clogged they are shaken periodically. The trip 93 contacts with the lower end of one of the trip arms and rotates the rock shaft to which it is secured until the throw-over weight passes the vertical. The weight falls and closes its valve. After the valve is closed the free end of the lever belonging to the group of that valve and bag falls into the recess 91 in the cam wheel 90. The link carried by that lever is lowered, the yoke in the link has come into reach of the shaking cam and the bag is shaken by an up and down movement, the annular weight 27 jerking the bag down when the cam part 34 of the yoke slips from the cam in a manner which will be readily understood. The bag is shaken until the cam wheel 90 in its revolution has elevated the free end of the lever from the recess 91 and so elevated the link and yoke that the cam is without effect on the cam part 34 of the yoke. Soon thereafter the trip 92 contacts with the upper end of the trip arm and rotates the rock shaft in the opposite direction until the throw-over weight passes the vertical. The weight then falls and opens the valve permitting the filtering operation to resume.

The construction and mode of operation of the modified form of construction illustrated by Fig. 4 of the drawings is very similar to that of the preferred form already described. In this construction the casing 94 is provided with the horizontal partitions 95 and 96 dividing the interior of the casing into three compartments 97, 98 and 99 and compartment 99 is in open communication with the atmosphere through aperture 100. Four bags, only two of which are shown 101 and 102 are located in compartment 99 and they are secured to imperforate heads supported by rods 103 from yokes 104 provided with cam parts 105. The yokes are reciprocatable in links 106 secured to levers 107, 108, 109 and 110 and the links are retained within guides 111 the same as in the preferred form of construction already described. The operation of spur gear 112, worm 113, worm wheel 114, cam wheel 115, band pulley 116, pinion 117, shafts 118 and 119, cams 120 and 121, screw conveyer 122 and scraping conveyer 123 is the same as that of the corresponding parts in the preferred form of construction already described at length and that description does not require repetition. The short pipes, of which only two 124 and 125 are shown, are placed below the bags and are provided with valves 126, 127, 128 and 129 on rock shafts to which

are secured trip-arms 130, 131, 132 and 133. Each rock shaft is also provided with a throw-over weight 134. The vertical shaft 135 is provided with two trips 136 and 137 to coöperate with the trip-arms 130, 131, 132 and 133 in the manner already described. The air current exhaust from the fan (not shown) laden with the dust or matter to be separated enters the casing 94 through the conduit 138 and is filtered by passing through the bags and escapes to the atmosphere through aperture 100. Each valve is alternately closed and opened by the trips 136 and 137 and while a valve is closed the free end of the lever belonging to the group of that particular bag drops into the recess 139 in the top of cam wheel 115 lowering the link and yoke so that the bag is shaken while its valve is closed.

What I claim is:

1. In a separator, shaking mechanism for a bag comprising a yoke, provided with a cam part, a cam for reciprocating said yoke, a link serving as a guide for the yoke while it is reciprocated and adapted to elevate the yoke so that it will not be reciprocated by the cam, and means to intermittently elevate said link and yoke.

2. In a separator, shaking mechanism for a bag comprising a yoke, provided with a cam part, a cam for reciprocating said yoke, a link serving as a guide for the yoke while it is reciprocated and adapted to elevate the yoke so that it will not be reciprocated by the cam, a lever connected to said link, and a cam wheel with a recess in its upper surface adapted to be revolved under the end of said lever.

In witnesses whereof I hereto affix my signature in presence of two witnesses.

HERMAN CARL STAHN.

Witnesses:

FRANK E. DENNETT,

FRED PALM.