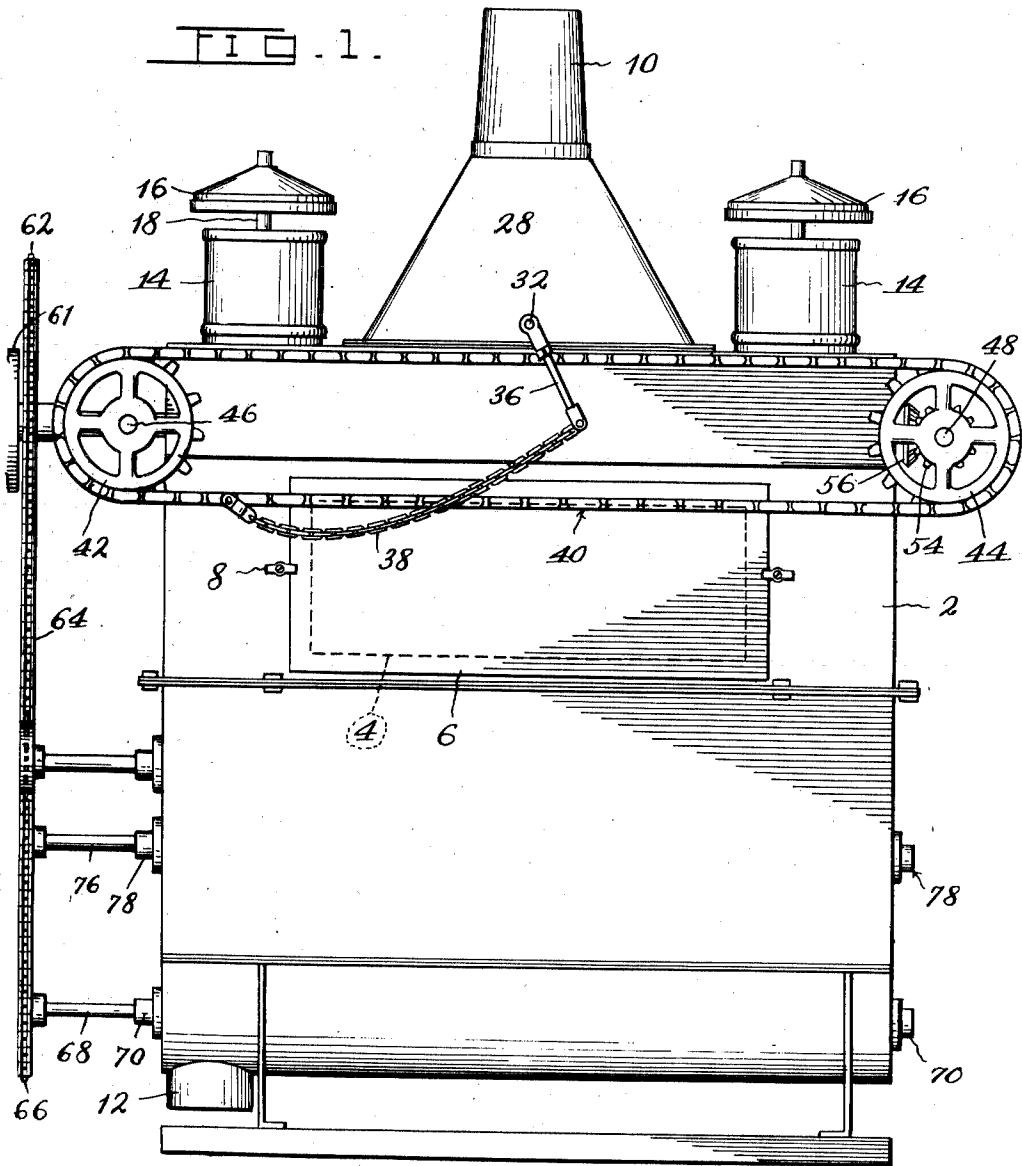


E. R. HOPKINS.
DUST COLLECTOR.
APPLICATION FILED JAN. 28, 1920.

1,341,129.

Patented May 25, 1920.
4 SHEETS—SHEET 1.



WITNESS:

R. Hamilton

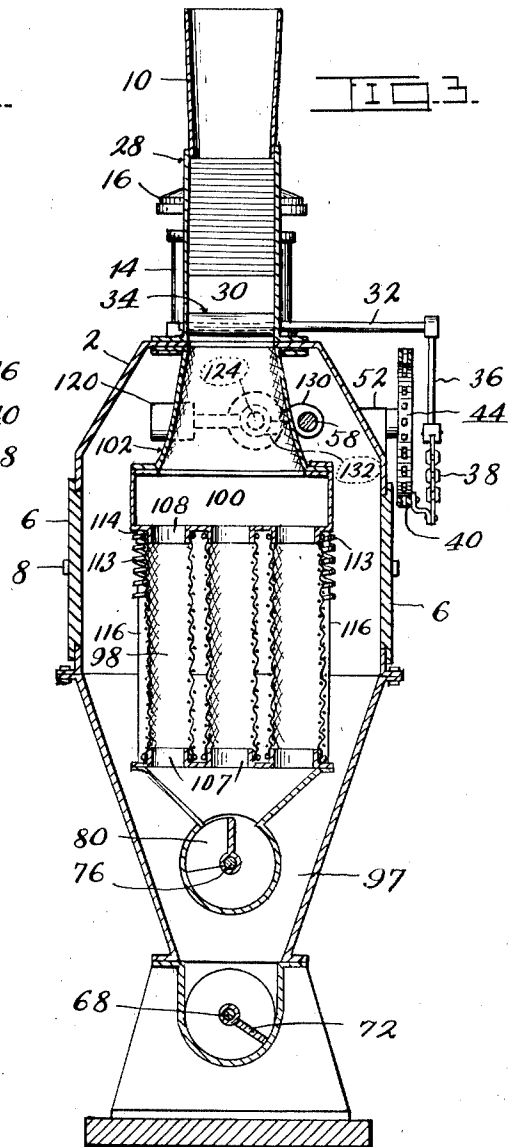
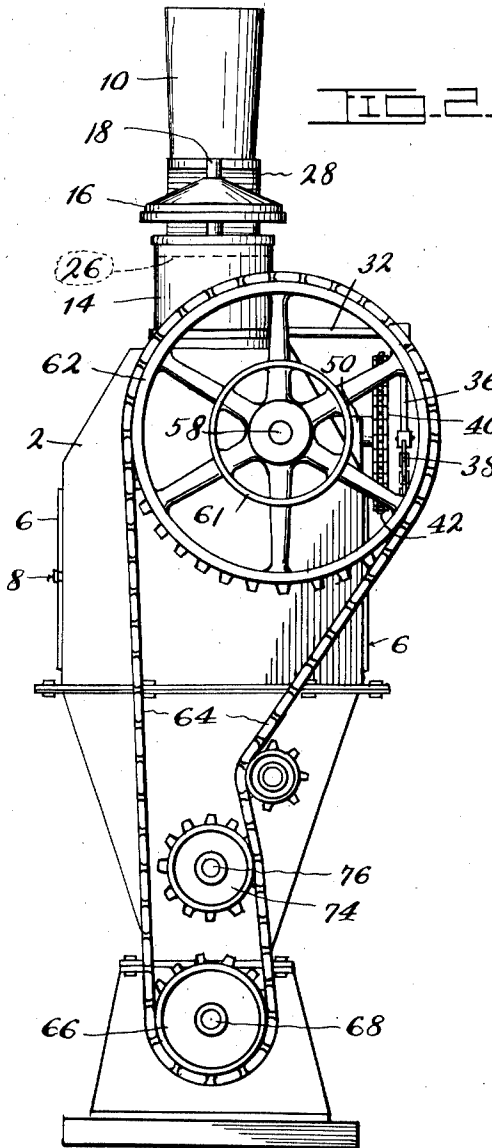
INVENTOR:
Ernest R. Hopkins,
BY
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4 SHEETS—SHEET 2.



WITNESS:

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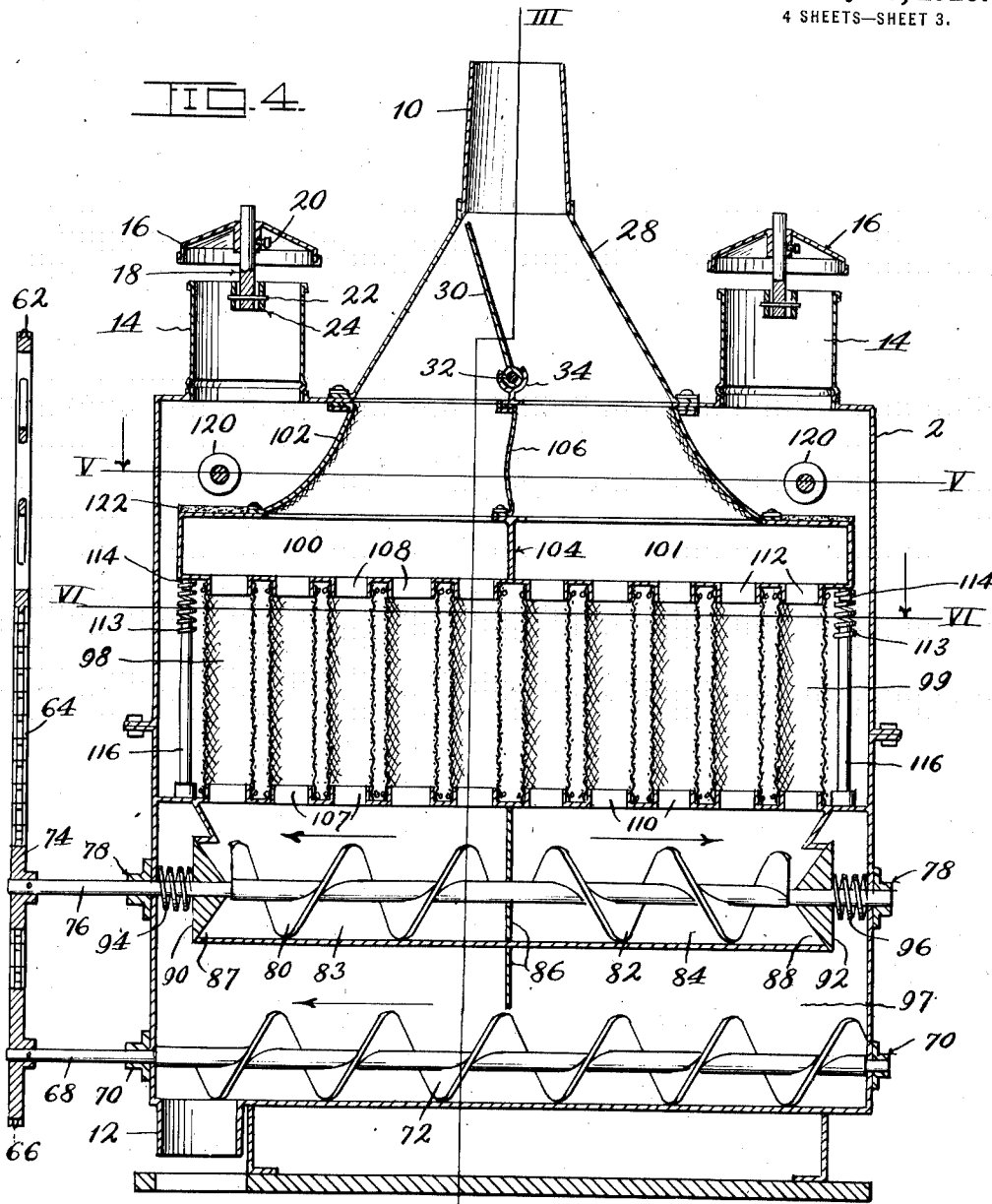
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4 SHEETS—SHEET 3.



WITNESS:

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INVENTOR:

Ernest R. Hopkins

BY

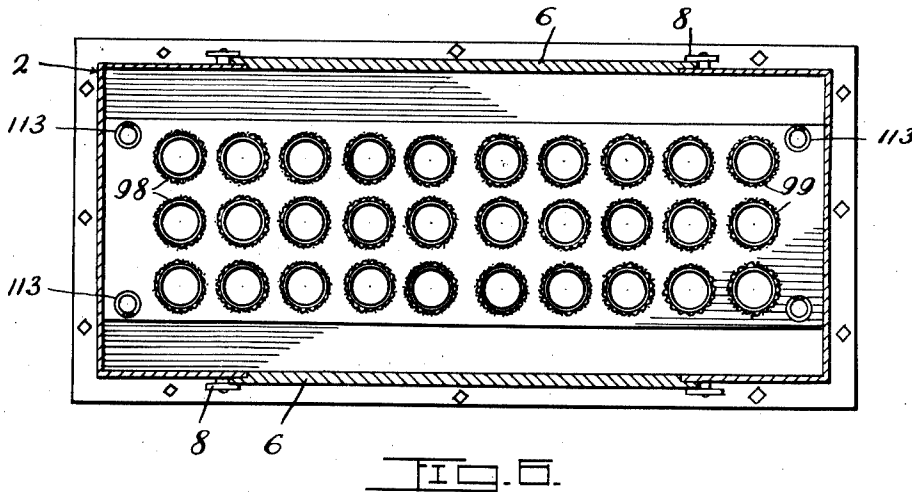
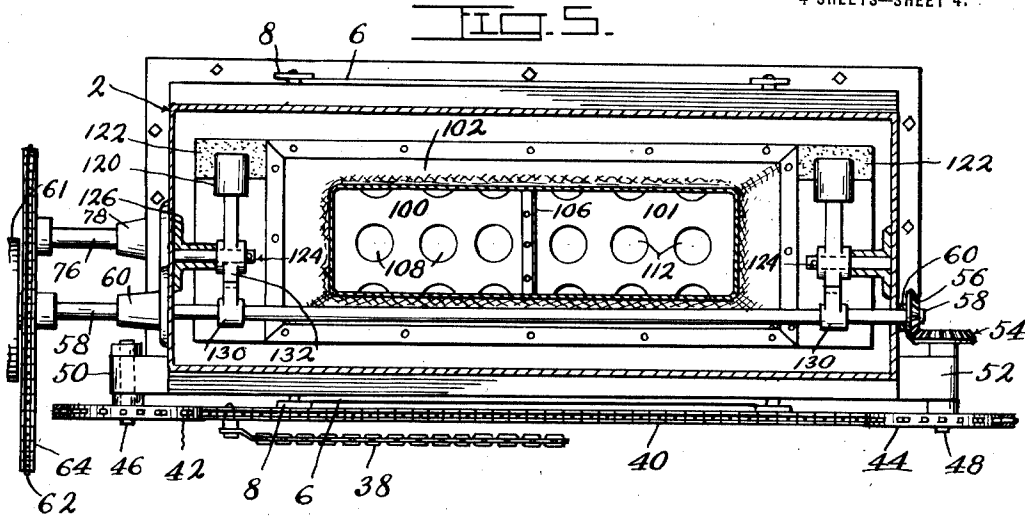
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4 SHEETS-SHEET 4.



WITNESS:

R. Hamilton

INVENTOR:
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UNITED STATES PATENT OFFICE.

ERNEST R. HOPKINS, OF INDEPENDENCE, MISSOURI.

DUST-COLLECTOR.

1,341,129.

Specification of Letters Patent.

Patented May 25, 1920.

Application filed January 28, 1920. Serial No. 354,637.

To all whom it may concern:

Be it known that I, ERNEST R. HOPKINS, a citizen of the United States, residing at Independence, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Dust-Collectors, of which the following is a specification.

My invention relates to improvements in dust collectors for use in flour and other mills where apparatus of this character is required, and one object is to provide a new and efficient apparatus whereby the dust or stock is collected for deposit in any suitable receptacle.

A further object is to provide a fire-proof apparatus with automatic means for closing the openings to the outer atmosphere for the purpose of smothering any fire which might occur within the apparatus by ignition of the stock.

Another object is to protect the warm moist stock passing through the filtering stockings of the apparatus from relatively cold drafts of air likely to cause said stock to dough up the stockings and prevent them from separating the stock from the dust laden air before the latter escapes to the atmosphere.

Other objects will hereinafter appear, and in order that the invention may be fully understood, reference will now be had to the accompanying drawings, in which:

Figure 1 is a side elevation of the apparatus.

Fig. 2 is an end elevation of the apparatus.

Fig. 3 is an irregular vertical section on line III—III of Fig. 4.

Fig. 4 is a vertical longitudinal section of the apparatus.

Fig. 5 is a horizontal section on line V—V of Fig. 4.

Fig. 6 is a horizontal section on line VI—VI of Fig. 4.

In carrying out the invention, I employ a case 2 made, preferably, of sheet metal or other fire-proof material. Access is had to the interior of the case through openings 4, normally closed by doors 6 removably held in place by suitable means such as turn-buttons 8. The upper portion of the case 2 is provided with an inlet spout 10 and its lower portion has a discharge spout 12. The upper portion of the case 2 is also provided with one or more ventilators 14 hav-

ing caps 16 adjustably secured to vertical stems 18 by set screws 20. The stems 18 normally hold the caps 16 spaced above the ventilators 14 and are secured by fusible elements 22 to sleeves 24 carried by bars 26 extending transversely across the upper portions of the ventilators 14.

The inlet spout 10 communicates at its lower end with a downwardly diverging valve shell 28, which is fixed to the top of the case 2 and provided with an oscillatory valve 30 fixedly-mounted at its lower end upon a shaft 32, rockably mounted in a bearing 34 extending across the lower portion of the shell 28.

The shaft 32 projects through one side of the shell 28 and is provided with a fixedly-mounted crank 36 having its free end connected to one end of a cable 38, which is connected at its opposite terminal to an endless sprocket chain 40 running around sprocket wheels 42 and 44, fixedly mounted upon shafts 46 and 48, journaled in bearings 50 and 52, respectively, secured to opposite ends of the case 2.

The shaft 48 is provided with a bevel gear 54 intermeshing with a bevel gear 56 fixed to one end of a drive shaft 58 extending longitudinally through the case 2 and journaled in bearings 60 at the ends of said case. A pulley 61 is fixed to the drive shaft 58 to actuate the same. The opposite end of the drive shaft 58 is provided with a large sprocket wheel 62, which drives an endless sprocket chain 64 running around a small sprocket wheel 66 fixed upon one end of a shaft 68, extending longitudinally through the lower portion of the case 2 and journaled in bearings 70 at the ends of said case.

That portion of the shaft 68 within the case 2 is provided with a worm conveyer 72, for conducting the stock to the discharge spout 12. The endless sprocket chain 64 also drives a small sprocket wheel 74 fixed to one end of a shaft 76 extending longitudinally through the case 2 at a point about the shaft 68 and journaled in bearings 78 at the ends of said case 2. That portion of the shaft 78 within the case 2 is provided with fixedly mounted right and left worm conveyers 80 and 82, respectively. The conveyers 80 and 82 are arranged in chambers 83 and 84, separated from each other by a partition 86 extending downwardly between the conveyers 80 and 82, respectively, and to

a point close to the conveyer 72, as disclosed on Fig. 4. The chambers 83 and 84 are provided with outlets 87 and 88 equipped with self-closing valves 90 and 92, slidably

- 5 mounted upon the shaft 76 and yieldably held in closed position by coil springs 94 and 96, respectively. The outlets 87 and 88 are arranged to discharge into a chamber 97, inclosing the conveyer 72.
- 10 The chambers 83 and 84 receive the stock from two groups of filtering means consisting of cloth or other suitable stockings 98 and 99, communicating with upper chambers 100 and 101, respectively, which alter-
- 15 nately receive the stock-laden air from the valve shell 28 through a flexible connection 102. The upper chambers 100 and 101, are separated from each other by a partition 104, and the flexible connection 102 is di-
- 20 vided by a flexible partition 106 made of cloth or other material like the connection 102.

The top of the chamber 83 and the bottom of the chamber 100 have nipples 107 and

25 108, respectively, to which the group of stockings 98 are secured, and the top of the chamber 84 and the bottom of the chamber 101 have nipples 110 and 112, respectively, to which the group of stockings 99 are se-

30 cured.

The upper chambers 100 and 101 are yieldably supported on springs 113 embracing studs 114 depending from the bottom of said chambers and embracing the upper

35 ends of standards 116, extending upwardly from the top of the chambers 83 and 84.

120 designates a pair of beaters for striking the top of the chambers 100 and 101, said top being protected from damage by

40 cushions 122, provided to receive the blows of said beaters. The beaters 120 are rockably mounted upon stub shafts 124, secured to brackets 126 fixed to the inner upper portion of the case 2. Cams 130 fixed to

45 drive shaft 58 are provided to engage the rear ends of the beater arms 132 to intermittently raise their weighted ends from the cushions 122.

In practice, the stock-laden air is forced

50 by the fan or blower (not shown) into the inlet spout 10 from which it enters the valve shell 28. As the stock-laden air enters the shell 28 it is alternately deflected into the chambers 100 and 101 by the oscillatory

55 valve 30, which is actuated through the intermediacy of its connections with the endless chain 40 which travels continuously when the machine is in operation. From the chambers 100 and 101, the dust laden air

60 enters the groups of stockings 98 and 99, and having no other egress, filters through the material constituting said stockings and escapes through the case 2 of the ventilators 14, while the stock which is separated from

65 the air falls into the chambers 83 and 84,

and is carried against the valves 90 and 92, by the conveyers 80 and 82, respectively. After the stock has accumulated to a sufficient density to open the valves 90 and 92 it is forced through the ports 87 and 88 by

70 the conveyers 80 and 82, respectively, and falls into the bottom of the case 2 from which it is forced through the spout 12 by the conveyer 72.

From the foregoing description it will be

75 understood that the right and left groups of stockings are alternately inflated by the dust-laden air, which in passing through the stockings under pressure, has a tendency to cause the lighter particles of dust or stock

80 to cling to said stockings and in time result in clogging the latter, so that they would fail in their function of filtering the air, but when the air under pressure is alternately cut off from said groups, the light particles

85 hang loosely within the stockings and are easily shaken off into the chambers 83 and 84 by the concussions created by the weighted ends of the beaters 120 striking

90 the top of the chambers 100 and 101. At each impact of the beaters 120, the chambers 100 and 101 are permitted to yield to a certain extent by the springs 112 and shake the dust free from the stockings when the

95 air pressure is alternately cut off by the valve 30, as above stated.

By inclosing the chambers 100, 101 and the stockings 98 and 99 in the case 2, the outer atmosphere is prevented from striking the warm, moist stock-laden air and

100 causing the same to condense in said stockings and dough or clog up the same.

Should the stock within the casing 2 take fire, the highly heated air in passing through the ventilators 14, would melt the fusible

105 elements 22 and permit the caps 16 to drop and close the upper ends of said ventilators 14, so that the fire would be smothered out.

While I have shown and described the preferred construction of the invention, I

110 reserve the right to make such changes in the combination, proportion and arrangement of parts, as properly fall within the spirit and scope of the claims.

Having thus described my invention, I

115 what I claim and desire to secure by Letters Patent, is:

1. In an apparatus of the character described, an upper chamber having an inlet for dust laden air, a lower chamber to receive

120 the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, means to intermittently cut off the dust laden air

125 from the upper chamber, and means for jarring the upper chamber and the filtering material to loosen the dust from the latter.

2. In an apparatus of the character described, an upper chamber having an inlet

130

for dust laden air, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, means to intermittently cut off the dust laden air from the upper chamber, means for jarring the upper chamber and the filtering material to loosen the dust from the latter, and means to force the dust from the lower chamber.

3. In an apparatus of the character described, an upper chamber having an inlet for dust laden air, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, means to intermittently cut off the dust laden air from the upper chamber, means for jarring the upper chamber and the filtering material to loosen the dust from the latter, means to force the dust from the lower chamber, and a self-closing valve to normally close the outlet of the lower chamber.

4. In an apparatus of the character described, an upper chamber having an inlet for dust laden air, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, a valve to intermittently cut off the dust laden air from the upper chamber, and means for jarring the upper chamber and the filtering material to loosen the dust from the latter.

5. In an apparatus of the character described, an upper chamber having an inlet for dust laden air, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, means to intermittently cut off the dust laden air from the upper chamber, means for jarring the upper chamber and the filtering material to loosen the dust from the latter, and a conveyer to force the dust through the outlet of the lower chamber.

6. In an apparatus of the character described, an upper chamber having an inlet for dust laden air, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, means to intermittently cut off the dust laden air from the upper chamber, means for jarring the upper chamber and the filtering material to loosen the dust from the latter, means to force the dust from the lower chamber, a self-closing valve to normally close the outlet of the lower chamber, and a worm conveyer to force the dust through said outlet.

7. In an apparatus of the character described, an upper chamber having an inlet for dust laden air, yieldable supports for said chamber, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, means to intermittently cut off the dust laden air from the upper chamber, means for jarring the upper chamber and the filtering material to loosen the dust from the latter, beaters to force the dust from the lower chamber, and a self-closing valve to normally close the outlet of the lower chamber.

8. In an apparatus of the character described, an upper chamber having an inlet for dust laden air, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, a valve to intermittently cut off the dust laden air from the upper chamber, an endless cable for actuating said valve, means for driving said cable, and means for jarring the upper chamber and the filtering material to loosen the dust from the latter.

9. In an apparatus of the character described, an upper chamber having an inlet for dust laden air, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, stockings interposed between said chambers to separate the dust from the air, means to intermittently cut off the dust from the upper chamber, and means for jarring the upper chamber and the filtering material to loosen the dust from the latter.

10. In an apparatus of the character described, an upper chamber having an inlet for dust laden air, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, means to intermittently cut off the dust laden air from the upper chamber, beaters for jarring the upper chamber and the filtering material to loosen the dust from the latter, and rotary means for actuating said beaters.

11. In an apparatus of the character described, upper chambers having inlets for dust laden air, lower chambers to receive the dust, filtering means interposed between the upper and lower chambers to separate the dust from the air, means to alternately direct the dust laden air into the upper chambers, and means for jarring the upper chambers and the filtering means to loosen the dust from the latter.

12. In an apparatus of the character described, upper chambers having inlets for dust laden air, lower chambers to receive

the dust, filtering means interposed between the upper and lower chambers to separate the dust from the air, means to alternately direct the dust laden air into the upper chambers, means for jarring the upper chambers and the filtering means to loosen the dust from the latter, and means to force the dust through the outlets in the lower chambers.

10 13. In an apparatus of the character described, upper chambers having inlets for dust laden air; lower chambers to receive the dust, filtering means interposed between the upper and lower chambers to separate
15 the dust from the air, means to alternately direct the dust laden air into the upper chambers, means for jarring the upper chambers and the filtering means to loosen the dust from the latter, means to force the
20 dust through the outlets in the lower chambers, and self-closing valves to normally close said outlets.

14. In an apparatus of the character described, upper chambers having inlets for
25 dust laden air, lower chambers to receive the dust, filtering means interposed between the upper and lower chambers to separate the dust from the air, a valve to alternately direct the dust laden air into the upper
30 chambers, and means for jarring the upper chambers and the filtering means to loosen the dust from the latter.

15. In an apparatus of the character described, upper chambers having inlets for
35 dust laden air, lower chambers to receive the dust, filtering means interposed between the upper and lower chambers to separate the dust from the air, means to alternately direct the dust laden air into the upper chambers,
40 means for jarring the upper chambers and the filtering means to loosen the dust from the latter, and right and left conveyers to force the dust through the outlets of the lower chambers.

45 16. In an apparatus of the character described, upper chambers having inlets for dust laden air, yieldable supports for the upper chambers, lower chambers to receive the dust, filtering means interposed between
50 the upper and lower chambers to separate the dust from the air, means to alternately direct the dust laden air into the upper chambers, and beaters for jarring the upper chambers and the filtering means to loosen
55 the dust from the latter.

17. In an apparatus of the character described, an upper chamber having an inlet for dust laden air, a lower chamber to receive the dust and provided with an outlet
60 through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, means to intermittently cut off the dust laden air

from the upper chamber, beaters for jarring the upper chamber and the filtering material 65 to loosen the dust from the latter, and cams for actuating said beaters.

18. In an apparatus of the character described, upper chambers having inlets for dust laden air, lower chambers to receive 70 the dust, groups of stockings interposed between the upper and lower chambers to separate the dust from the air, means to alternately direct the dust laden air into the upper chambers, and means for jarring the 75 upper chambers and the groups of stockings to loosen the dust from the latter.

19. In an apparatus of the character described, upper chambers having inlets for dust laden air, lower chambers to receive 80 the dust, filtering means interposed between the upper and lower chambers to separate the dust from the air, means to alternately direct the dust laden air into the upper chambers, means for jarring the upper 85 chambers and the filtering means to loosen the dust from the latter, and right and left conveyers to force the dust through the outlets of the lower chambers.

20. In an apparatus of the character de- 90 scribed, an upper chamber having an inlet for dust laden air, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said cham- 95 bers to separate the dust from the air, means to intermittently cut off the dust laden air from the upper chamber, means for jarring the upper chamber and the filtering material to loosen the dust from the latter, and a case 100 inclosing the upper and lower chambers and the filtering material and having an opening for the escape of the filtered air.

21. In an apparatus of the character described, an upper chamber having an inlet 105 for dust laden air, a lower chamber to receive the dust and provided with an outlet through which the dust is discharged, filtering material interposed between said chambers to separate the dust from the air, means 110 to intermittently cut off the dust laden air from the upper chamber, means for jarring the upper chamber and the filtering material to loosen the dust from the latter, a case inclosing the upper and lower chambers and 115 the filtering material and having an opening for the escape of filtered air, a cap for closing said opening, and fusible means to normally support said cap in open position.

In testimony whereof I affix my signature, 120 in the presence of two witnesses.

ERNEST R. HOPKINS.

Witnesses:

F. G. FISCHER,
L. J. FISCHER.