

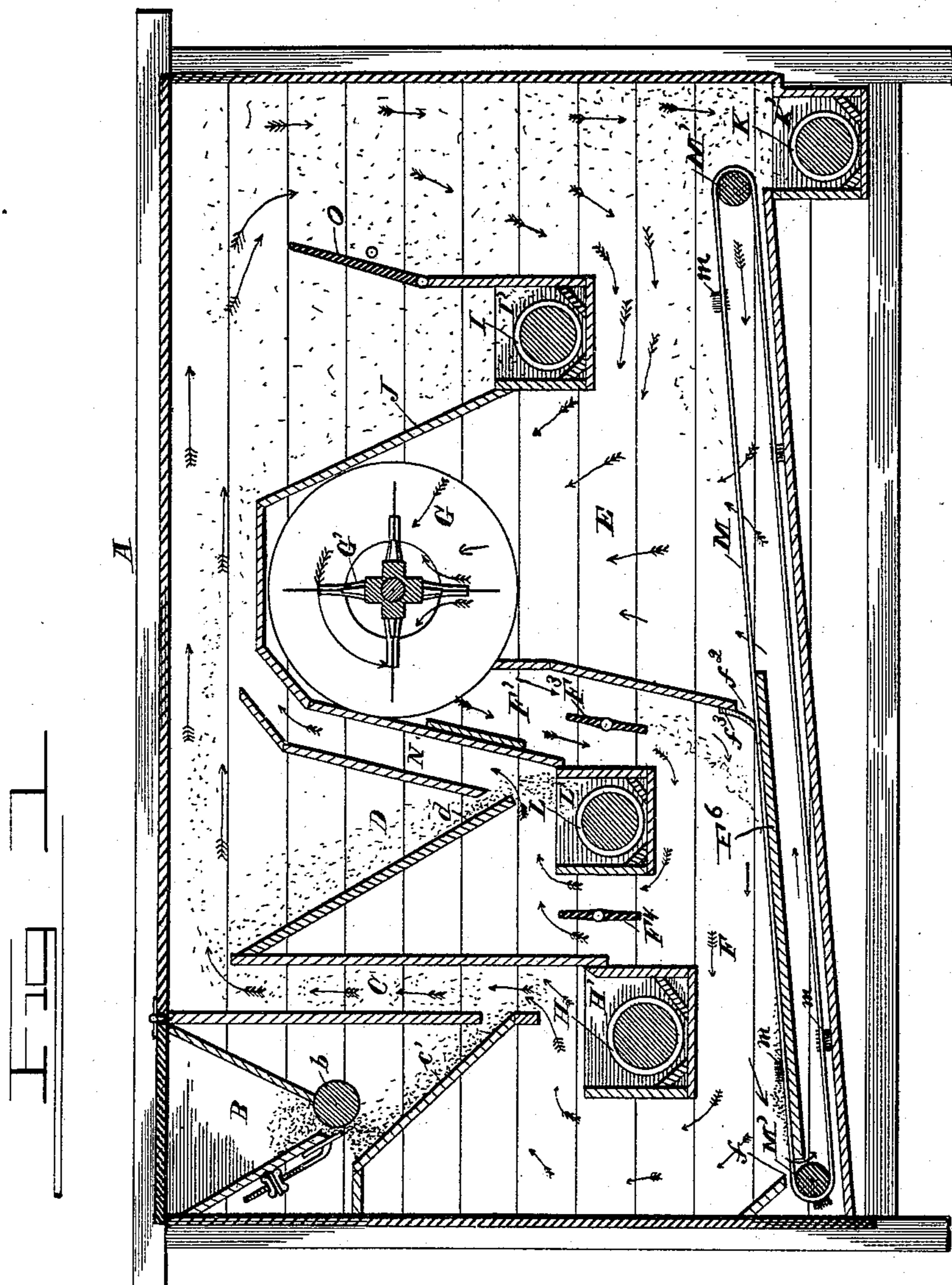
(No Model.)

2 Sheets—Sheet 1.

H. A. BARNARD.  
AIR BELT PURIFIER.

No. 485,571.

Patented Nov. 1, 1892.



Witnesses

L. W. Seville.  
A. E. Towell.

Inventor

Herman A. Barnard.

By his Attorneys

Alexander & Towell.

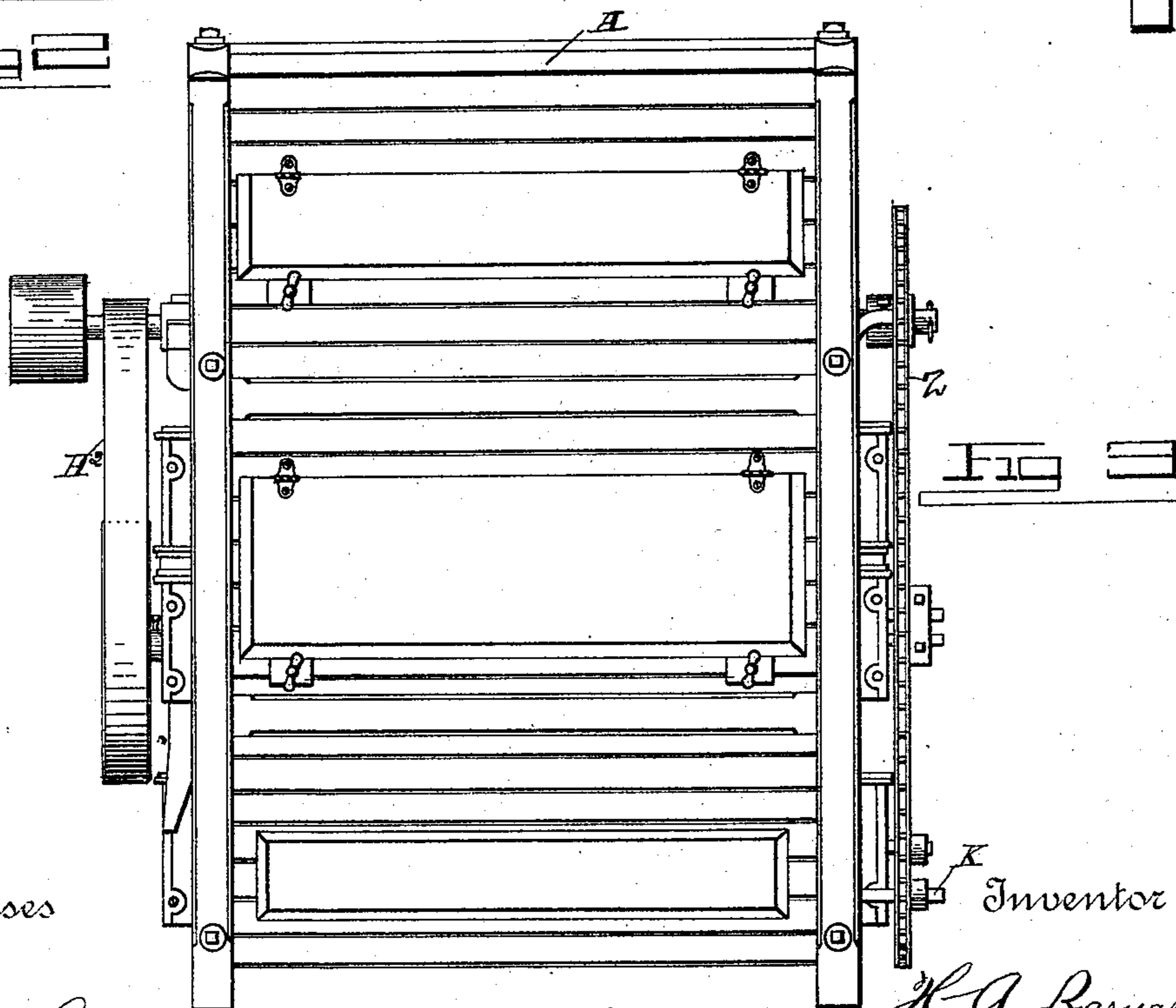
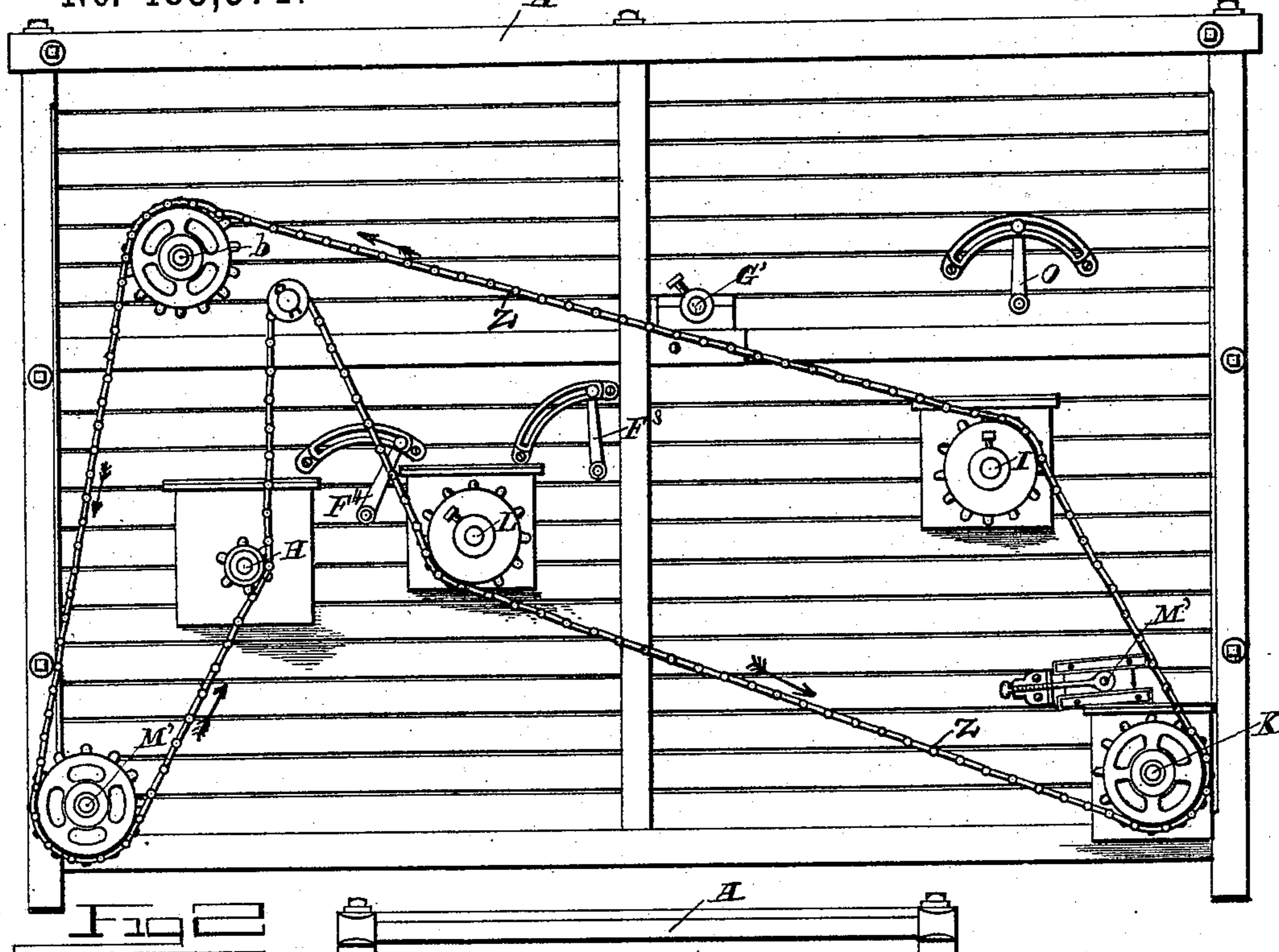
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C. W. Seville.  
Arthur E. Fowell.

Inventor  
By his Attorneys *H. A. Barnard.*  
*Alexander & Fowell*

# UNITED STATES PATENT OFFICE.

HEMAN A. BARNARD, OF MOLINE, ILLINOIS, ASSIGNOR TO THE BARNARD & LEAS MANUFACTURING COMPANY, OF SAME PLACE.

## AIR-BELT PURIFIER.

SPECIFICATION forming part of Letters Patent No. 485,571, dated November 1, 1892.

Application filed March 28, 1892. Serial No. 426,728. (No model.)

*To all whom it may concern:*

Be it known that I, HEMAN A. BARNARD, of Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Air-Belt Purifiers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a central vertical longitudinal section through my improved air-belt purifier. Fig. 2 is a side elevation thereof. Fig. 3 is an end elevation.

This invention is a purifier for grain, middlings, &c.; and its object is to increase the number of purifications of the material which can be made at one passing through the machine and to separately deliver the different grades of material and waste from the machine; to make one fan produce a continuous air-current, which will, however, be split up, so that equally-clean air will be supplied to the air-separating trunks; to provide ample dust-settling chambers, and to make one device clean both dust-settling chambers.

The invention therefore consists in the novel combination and arrangement of separating-trunks, fan, conveyers, and scraper-belts, &c., as will be hereinafter fully described and claimed.

In the drawings are shown but two separating devices, but more might be used, if desired, by lengthening the machine.

Referring to the drawings by letters, A designates the casing of the machine, closed on all sides, top, and bottom.

B is a feed-hopper in the front end and upper corner thereof, preferably having a distributing-roller *b* in its mouth, which delivers the material to be cleaned onto an inclined shunt-board *c'*, by which said material is directed into the lower end of a vertical air-trunk C, extending transversely of the machine beside the hopper and depending below the same. Below said trunk is a receiving-trough H', in which is a conveyer H, by which material is carried out of the machine. The inner wall of the air-trunk is connected

to the inner side of the trough H'; but air can pass up between the end wall of the casing and over the trough into the trunk and escape over the rear wall of the trunk at the top of the casing, as indicated by the arrows. 55

D is a hopper beside the upper end of trunk C and communicating therewith, having an inclined bottom *d*, arranged to catch material carried up through said trunk and falling onto said inclined bottom and direct it into the lower end of a substantially-vertical air-trunk N, standing transversely of the machine and having a trough L' at its lower end, in which is a conveyer L. Troughs H' L' lie near together and about in the same plane and air can pass up between said troughs over trough L' into trunk N, as indicated by the arrows. 65

G is a fan casing or chamber beside the trunk N, and G' the fan therein, and J is a hopper at the opposite side of the fan-chamber, communicating with trunks C and N over the top of the fan-chamber, as indicated. 70

I' is a trough at the bottom of said hopper, provided with a conveyer I. The rear side of hopper J is formed with an adjustable portion or valve O, which can be turned back and forth, so as to increase or lessen the width of said hopper. The air can pass over said hopper down beside and beneath trough I' and then up into the fan-casing, as indicated by the arrows. From the fan-chamber it escapes through a passage F' into a chamber or passage F, extending beneath both troughs H' L', and thereby communicating with both trunks C N, as described. The bottom F' of chamber F is slightly above the bottom of the casing and parallel therewith and has an opening *f* at its end adjoining the end of the casing, through which material deposited on the floor of chamber F can be swept out into the chamber E. The space below the hopper J, fan-casing G, and chamber F, I call a "dust-settling chamber" E. The bottom of the casing is inclined from front to rear and has a trough K' at its rear end, provided with a conveyer K. 85 90 95

M is an endless belt or belts running over pulleys or rollers M' M', journaled in the sides of the casing near the opposite ends and just above the floor thereof. The upper part of said 100

belt runs through chamber F close to the floor thereof, entering said chamber through an opening  $f^2$  at the lower end of passage F', closed by a flap-valve  $f^3$ , and passing from the chamber through opening  $f$ , as shown. These belts carry brushes  $m m$ , which as the belt travels alternately sweep or scrape the floors of chambers F and E, carrying material from chamber F into chamber E and thence into trough K'. The upper part of belt M thus sweeps chamber F and its lower part chamber E. I thus dispense with any independent brushing device for chamber F. Power is applied to the fan-shaft. From this shaft motion is transmitted to the shaft of conveyer H by a belt  $H^2$  and pulleys of such relative size that the speed of the fan is high and of the conveyer slow. Motion may be imparted to the feed-roller  $b$ , the pulleys M, and the conveyers L I K from the conveyer H by means of a single sprocket-chain Z and sprockets, as indicated in Fig. 2.

$F^3$  is a valve in passage F' for regulating the admission of air into chamber F, and  $F^4$  is a valve for regulating the admission of air from chamber F to the separating-trunk N. In operating the device the fan is started and the air circulates continuously in the directions indicated by the arrows. The material is then fed from the hopper into trunk C and the valve  $F^4$  is adjusted, so that the strongest current of air will be through trunk C. This current carries up all except the best and heaviest grade of material, which is deposited in trough H'. The material blown through trunk C falls in hopper D and is directed into trunk N, where the second separation is made, the second grade of material falling into trough L', the other material being blown out of trunk N over the fan-casing, where the third grade of material is caught in hopper J. The very light fluffy material and dust may be blown directly over hoppers D and J into the chamber E, where it will be deposited and be swept into trough K'. Before the air again reaches the separating-trunks it is compressed in passage F' and then expanded into chamber F, and any impurities deposited on the floor of said chamber are removed by the traveling brushes eventually into trough K'. It will be observed that the air-current through trunk C can expand immediately over hopper D and the currents from both trunks C and N can expand over hopper J. Thus the deposit of material in said hoppers is facilitated and the current finds room for greatest expansion in chamber E, and the deposit of dust, &c., therein is facilitated by the downward direction of the incoming current. A secondary air-current may be established through chambers F and E and fan-casing direct, as indicated by the tailless arrows in Fig. 1, which will assist in causing deposit of dust, &c., in chambers F and E. It is not actually necessary that the conveyers be provided with flap-valves, as the amount of air entering or escap-

ing through the openings thereof is not sufficient to noticeably affect the operation of the machine.

Having described my invention, what I claim as new, and desire to secure by Letters Patent thereon, is—

1. The combination, in an endless air-belt purifier, of a pair of air-trunks, a hopper between the same receiving from one and delivering to the other, receptacles for the material falling through said trunks, an air-chamber below and supplying air to said trunks, a fan-chamber communicating with said air-chamber, and a settling-chamber communicating with said fan and receiving air from air-trunks, and means for removing the matters deposited in the receptacles and dust-chamber, substantially as described.

2. The combination, in an endless air-belt purifier, of a pair of air-trunks, a hopper between the same receiving from one and delivering to the other, receptacles for the material falling through said trunks, an air-chamber below and communicating with said trunks, a fan-chamber communicating with said air-chamber, and a settling-chamber communicating with said fan and receiving air and dust from said air-trunks, a hopper interposed between the second trunk and dust-chamber, valves for independently regulating the passage of air through said trunk, and means for removing the material deposited in said receptacles, hopper, and dust-chambers, substantially as set forth.

3. The combination of the fan-chamber, the air-chamber at one side thereof, the separating device in said air-chamber, and the settling-chamber below said fan-chamber and air-chamber, with the traveling brushes or scrapers arranged to alternately sweep the floor of the air-chamber and dust-chamber, substantially as described.

4. The combination of the separating devices, the fan-chamber, the chamber F, and the chamber E, extending beneath chamber F, with the pulleys and endless belts thereon, substantially as described, arranged so that the upper parts thereof extend through the chamber F and the lower parts of said belts are in chamber E, with the brushes or scrapers connected to said belts and adapted to alternately sweep the floor of chamber F and chamber E, substantially as described.

5. The herein-described air-belt purifier, consisting of the casing, a feed-hopper therein, an air-trunk beside said hopper receiving material therefrom, a trough and conveyer below said trunk, a hopper communicating with the upper end of said trunk, a second air-trunk receiving material from the latter hopper, a trough and conveyer below said second trunk, a third hopper communicating with the upper end of said second trunk, a fan-chamber and fan interposed between the second trunk and last hopper, an air-chamber below and supplying air to said trunks and

5 their troughs, communicating with said fan-chamber, and a dust-chamber below the air-chamber, fan-chamber, and hoppers, communicating with said fan-chamber, the valves, and devices for removing material deposited in said troughs and chambers, all substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HEMAN A. BARNARD.

Witnesses:

W. H. HILLHOUSE,  
C. V. GOULD.