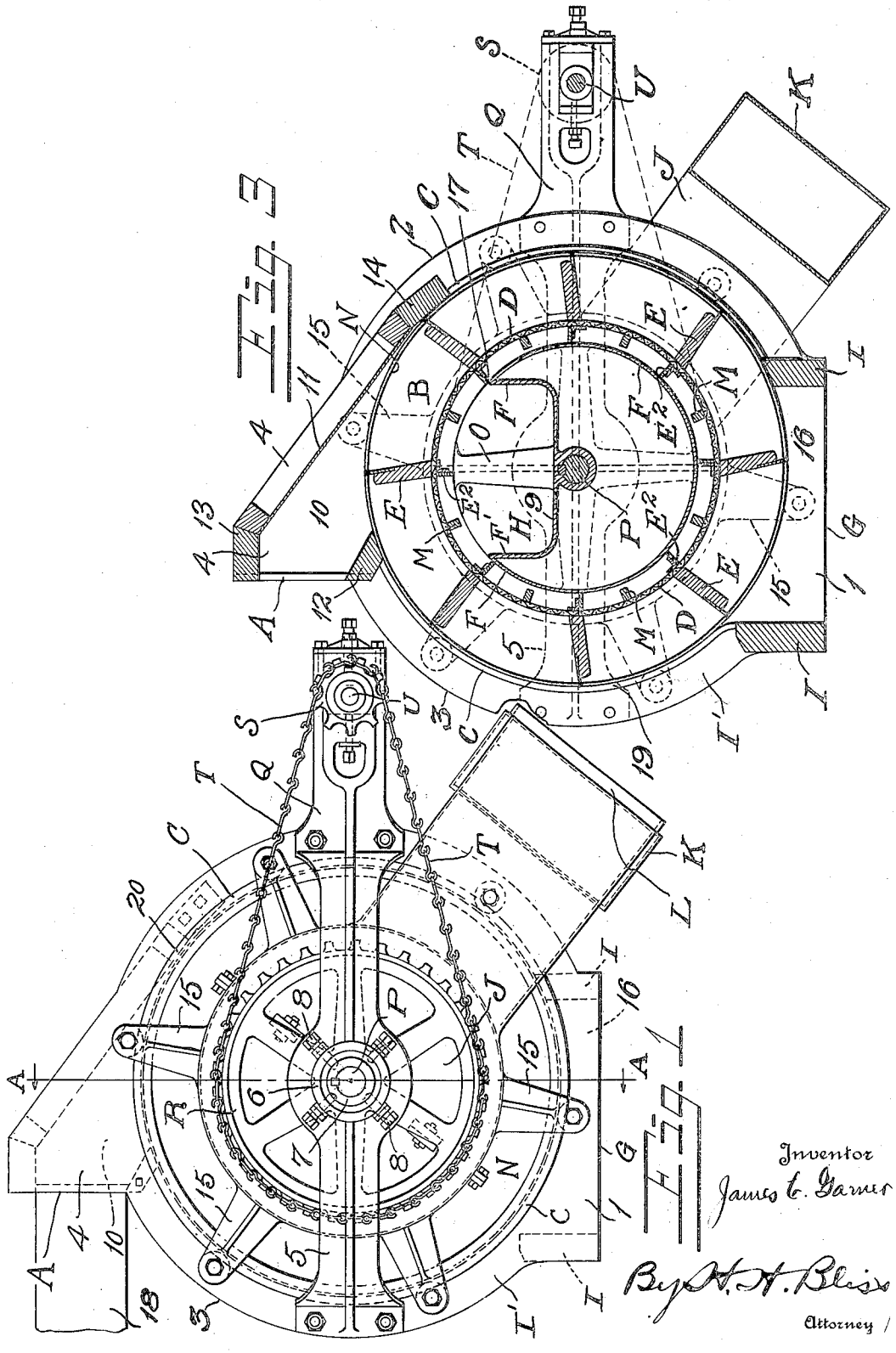
J. C. GARNER.

COTTON SEPARATOR.

APPLICATION FILED AUG. 7, 1917. RENEWED JAN. 7, 1921.

1,397,001. Patented Nov. 15, 1921.

2 SHEETS—SHEET 1.



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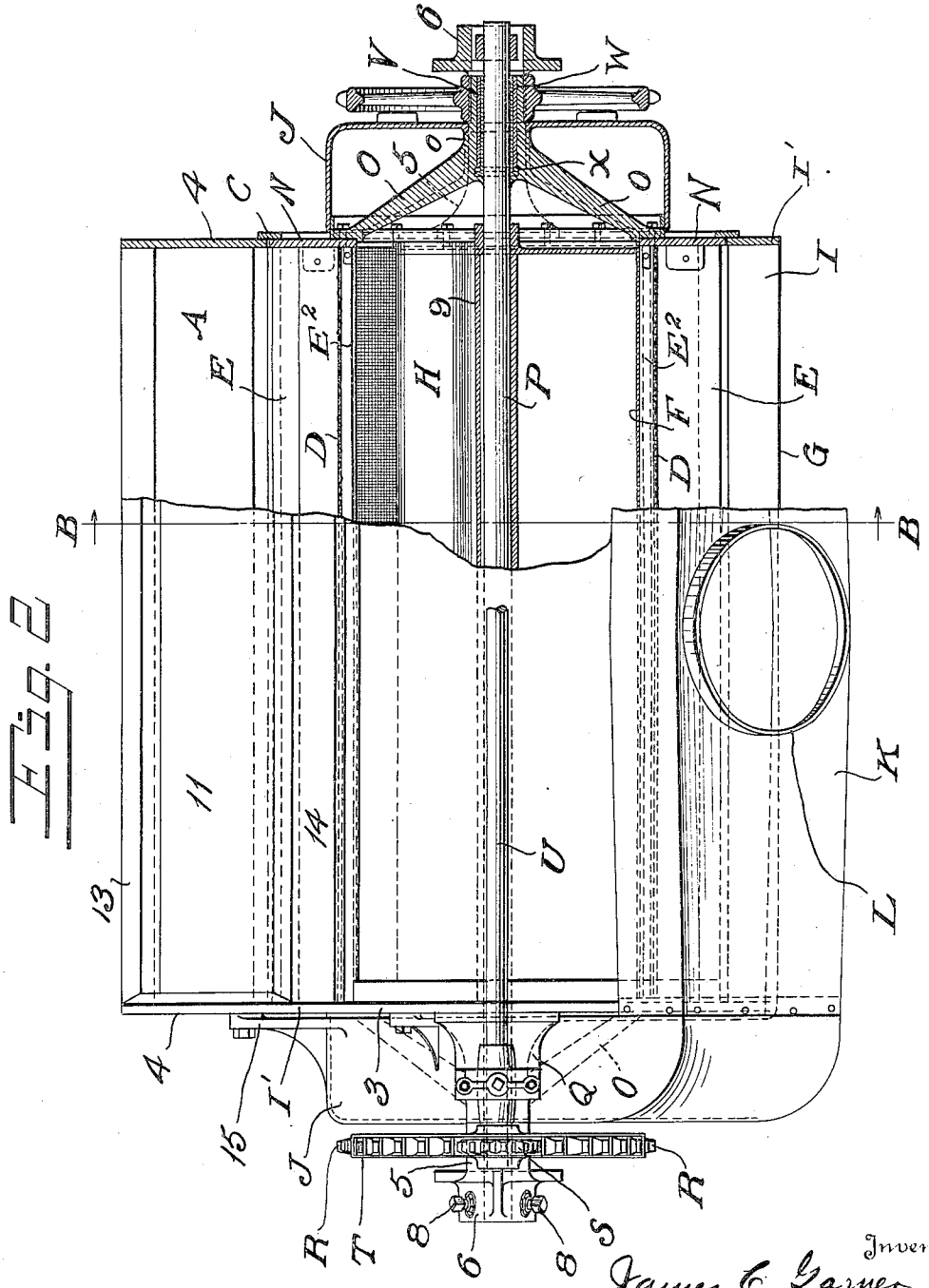
COTTON SEPARATOR.

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2 SHEETS—SHEET 2.

Fig. 2



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UNITED STATES PATENT OFFICE.

JAMES C. GARNER, OF HOUSTON, TEXAS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE GARNER GIN COMPANY, INC., OF HOUSTON, TEXAS, A CORPORATION OF TEXAS.

COTTON-SEPARATOR.

1,397,001. Specification of Letters Patent. Patented Nov. 15, 1921.

Application filed August 7, 1917, Serial No. 184,958. Renewed January 7, 1921. Serial No. 435,757.

To all whom it may concern:

Be it known that I, JAMES C. GARNER, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Cotton-Separators, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in mechanism for pnuematically elevating or transporting materials of certain classes. It was primarily designed for the handling of cotton, but is also adapted for use with other materials more or less analogous, which require to be elevated or transported for any one of several purposes.

Difficulty has been experienced with apparatus of this sort as heretofore constructed, owing to the tendency of material like cotton to be arrested in, and to choke or clog, the ducts through which it is taken by currents of air.

The object of the present improvement is to provide a mechanism which will have a large capacity, without material enlargement of parts; and to provide for the delivery of a continuous stream of air laden with cotton or the like, the air passing once through a foraminous wall and then exhausting directly to the open atmosphere, and the cotton which it deposits being withdrawn as a continuous discharge.

Figure 1 is an end view of a mechanism embodying my improvements.

Fig. 2 is a side elevation, partly in section on line A—A, Fig. 1.

Fig. 3 is a vertical section on line B—B of Fig. 2.

As shown in the drawings, the machine is supported on a base comprising cross beams or bars I—I. To these are secured, and upward from them extend, frame elements or sections 1—1, one at each end of the mechanism. Each section or frame element is formed with a skirt or bottom part 1, a curved section 2 at the front, a curved section 3 at the rear, and an upwardly projecting wall section 4.

These parts of the frame support the sections 19 and 20 of a housing C, the sections constituting parts of a sheet metal cylinder.

At each end of the machine there is a bracket 5 extending from side to side of the outer frame element and, at its ends, bolted thereto. Each bracket 5 has a hub 6 for receiving and supporting a stationary shaft P. This shaft is at each end rigidly secured to a holding ring 7, fixed adjustably in position by means of adjusting screws 8 passing through the hub 6 and engaging with sockets in the ring.

Rigidly fastened to the stationary shaft P is an inner stationary drum F. The greater part of its periphery is cylindrical in shape, and imperforate. The upper part of the periphery is cut away or omitted and duct walls are turned inward as at F′ and joined by a wall 9; these forming an air duct which is cut off from communication with the interior of the drum.

Loosely mounted on the stationary shaft P is a rotor element, comprising the following parts: At each end there is a spider O, having a hub *o*, surrounding the shaft. V is a bushing secured to the spider hub; W is a bearing sleeve on the shaft; and at X there is an air-tight and dust-proof packing.

The arms of the spider, at each end of the machine, are secured to a wide ring-plate or annular head N, which is fitted as closely as possible to the opening in the end plate part of the housing. The head rings N at the ends of the machine are connected by comparatively large wide bars or plates E, and also narrower bars M, both disposed substantially parallel to the axis. A rotary drum D is supported by these bars, it being immediately outside of the bars M and immediately inside of the bars E. This drum D can be of any suitable material, as wire mesh, adapted to arrest the fibers of cotton, or other material, but permitting the air to escape therefrom and pass through the drum D to the exhaust duct H.

E^2 are valve bars or plates on the inside of the cylinder of the drum extending inward. Each is preferably formed of light angle iron with a soft or flexible packing, such as felt or rubber, secured thereto. These valves at E^2 extend across the annular space between the drum cylinder D and the cylindrical wall of the inner drum F.

The bars or plates E act also as valves to close and open the larger annular space B outside of the rotary drum D and between the latter and the outer stationary casing or housing C. Each is provided with a pack-

ing strip of soft or flexible material which can safely fit against the sheet metal of the part C to form an air-tight space.

A indicates the inlet passage through which the stream of air carrying the cotton or other material travels from the outer supply duct on its way to the exhaust fan. 10 is a duct with its longitudinal lines tangential to the axis of the rotor, for the delivery of the air, and its load, to the interior annular chamber B. The duct 10 is inclosed by the upper plates 4, of the end elements of the frame or casing, and by top wall 11, supported on bars 12, 13 and 14.

The duct H in the inner stationary drum F communicates at each end with a hood chamber J, each hood being carried by radial arms 15, which at their outer ends are bolted to the frame or casing. And each of the hoods communicates with a duct L that leads to the suction fan.

The outer stationary housing C has an opening at 16 at the bottom, the housing being in fact two curved sections, one on the front side and one on the rear side of the apparatus, each extending from a cross-bar or beam I up to the inlet chamber 10. On each side of the opening at 16 the air is cut off by the valve plates E on the outside of the drum, and the valve plates E^2 on the inside. As each inner valve E^2 reaches the point at 17, that is, reaches the wall of the inner duct H, a dead chamber or vacuum space is formed. And after passing the line 17 these inner valves E^2 relieve the drum D from inward pressure and the material which was initially drawn against the drum, can fall away. And when the sub-chambers of the annular chamber B reach the opening at 16 in the housing they permit the material to drop through the escape passage G.

Q—Q are brackets, one at each end of the mechanism. They are bolted to the parts 2 and 3 of the framework and extend radially outward. They are provided with adjustable boxes in which is mounted the power shaft U. This shaft is provided with driving sprocket wheels S, and from these chains T extend to larger sprockets R which are secured to the spider hub. By these devices the rotor element of the apparatus is rotated.

The mode of operation of the mechanism above described will be readily understood. From the inlet passage at A a supply duct extends to the point where the cotton or other material is introduced which it is desired to be delivered through the exit G. An exhaust fan is connected with the duct L. When in operation it draws a current of air through the supply duct 18, inlet duct 10, the upper part of the drum D, the duct H, the hoods J, and the ducts K and L.

The cotton which is carried upward through the supply duct 18 travels with the air current and reaches the upper part of the drum D. It is arrested in comparatively small masses on the surface of the drum and, for a short period, is held there by the inward pressure of the air. But the rotating valve plates E successively act to cut the pressure off from the larger part of the drum, and the interior valves at E^2 correspondingly prevent the air from entering the region between the rotary drum and the inner stationary wall at F. Consequently, by the time any section of the drum D between a valve E and the next reaches the escape opening at G, the material adhering to that section of the drum is free to move outward. And under the action of its own gravity and the centrifugal force derived from the drum it is rapidly passed downward through the exit.

I have found that a mechanism embodying the features of structure, and operated in the way described, can be used to great advantage in separating from streams of air masses of light flocculent material, such as cotton, and that there is no choking or clogging of the surfaces where the masses or particles are arrested.

In order to convey a clear understanding of a mechanism embodying my improvements, I have above described somewhat in detail the apparatus shown in the drawings. But it will be understood that modifications can be made in a number of respects.

The drum D constitutes a wall or diaphragm partition interposed between the supply duct and the exhaust duct. It is made in several foraminous sections through which the air can pass, and with it are combined means for moving it in such a way that its sections successively pass from a position where each lies directly between the two ducts to another position where the solid material caught thereon can be removed therefrom; and with it are also combined means which prevent the air from the supply duct passing through any section of the foraminous material at the time when it is discharging the collected material; in fact, prevent it from passing radially outward or inward through any of the larger part of the area of the drum, without interfering with its passing freely and continuously through the relatively small part of the area where the cotton and the air are first received. As the air is exhausted from the interior of the drum through its ends and not allowed to move radially in either direction over the greater part of the drum, the latter can be made relatively small in diameter and yet provide a machine of large capacity in comparison with machines which first take the air inward through a drum and then outward radially, or approximately radially, again through its wall, prior to the discharge.

As above stated, I prefer to employ for this foraminous wall a reticulated or woven-wire structure, but others which are permeable to air can be employed.

What I claim is:

1. In a mechanism of the class described, the combination of a rotary foraminous drum having a cylindrical wall permeable to air, a normally open air duct inside of said drum communicating with the air passages of a predetermined area of its wall, and arranged to conduct the air continuously outward through the ends of said drum, a discharge passage for the material collected on the drum, a normally open air duct around and outside of a part of the drum and between the supply duct and the discharge passage, and intermittingly operative means for closing the said outside duct against the passage of air through the drum.

2. In a mechanism of the class described, the combination of a rotary foraminous drum having a cylindrical wall permeable to air, a normally open air duct inside of said drum communicating with the air passages of a relatively small predetermined area of its wall, and adapted to conduct the air outward from the interior of the drum through the ends thereof, a discharge passage for the material collected on the drum, a normally open air duct around and outside of a part of the drum and between the supply duct and the discharge passage, a normally open air duct inside and around part of the concave surface of the drum and between the supply duct and the discharge passage, and intermittingly operative means for closing both the said outside air duct and the said inside air duct against the passage of air through the greater part of the area of the drum, but permitting it to move continuously through the aforesaid smaller part of said area.

3. In a mechanism of the class described, the combination of a rotary foraminous drum having a cylindrical wall permeable to air, the housing around the drum, the inlet passage for air and cotton through the wall of the housing, the discharge passage in the housing, the stationary drum inside of the rotary drum, having an air duct constantly communicating with the said cotton and air inlet and having outlet passages extending through the ends of the drum, the series of valves between the rotary drum and the stationary drum arranged to permit air to be drawn into the interior of the rotary drum through a section thereof and to prevent air from passing either inward or outward radially through the other section of the drum when opposite to the discharge passage.

4. In a mechanism of the class described, the combination of the inner stationary drum, the rotary drum, the air duct within the rotary drum, arranged to conduct the air outward through the ends of the drums, the discharge passage for the solid material collected on the drum, means for drawing air into said inner duct through a predetermined portion of the drum, successively operative devices rotating with the drum for preventing air from passing outward radially through any part of the drum.

5. In a mechanism of the class described, the combination of a rotary foraminous drum, a supply duct leading to the exterior of the drum, an exhaust duct on the inside of the drum communicating with the passages successively through the wall of the drum, and communicating continuously with the open atmosphere through the ends of the drum, a series of intermittingly acting valves outside of the drum successively cutting off sections of the drum from the air pressure, and a series of intermittingly acting valves inside of the drum arranged to intermittingly permit and then prevent air from passing through the passages in the drum.

6. In a mechanism of the class described, the combination of a rotary foraminous drum, an air supply duct leading to the outside of the drum, an exhaust duct within the drum arranged to receive air through a predetermined section of the drum, and to conduct it continuously through the ends of the drum, a housing outside of the drum having a discharge passage, valve plates arranged to close the space air-tight between the drum and the housing over a predetermined area of the drum to prevent air passing through it radially either outward or inward around the last said area.

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

JAMES C. GARNER.

Witnesses:

ALEXANDER S. MACKENZIE,

W. J. BARRY.