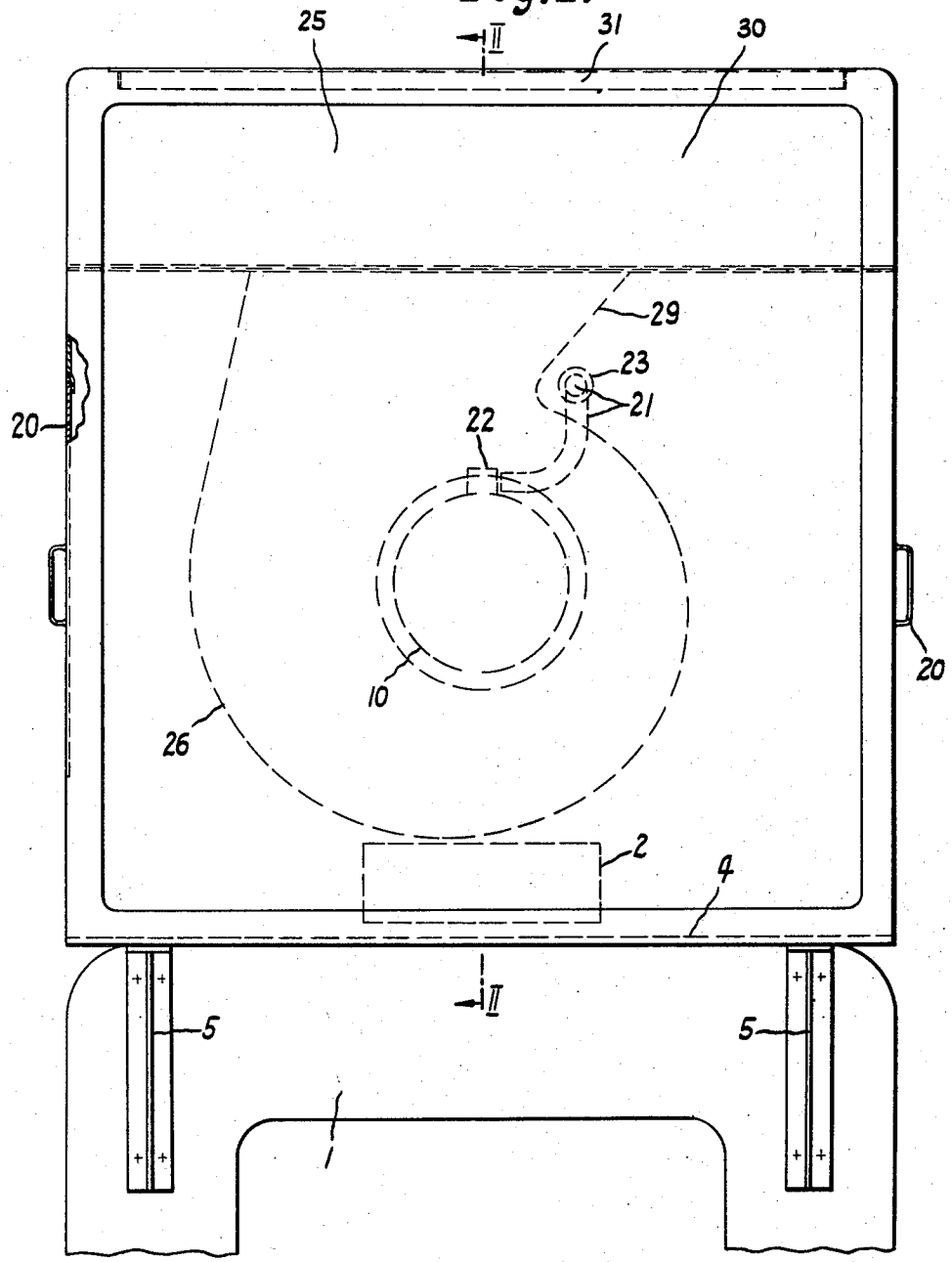
July 29, 1958 H. BERBERICH ET AL 2,845,139

AIR EXHAUSTING AND FILTERING ARRANGEMENT

Filed Oct. 20, 1955 4 Sheets-Sheet 1

Fig. 1.



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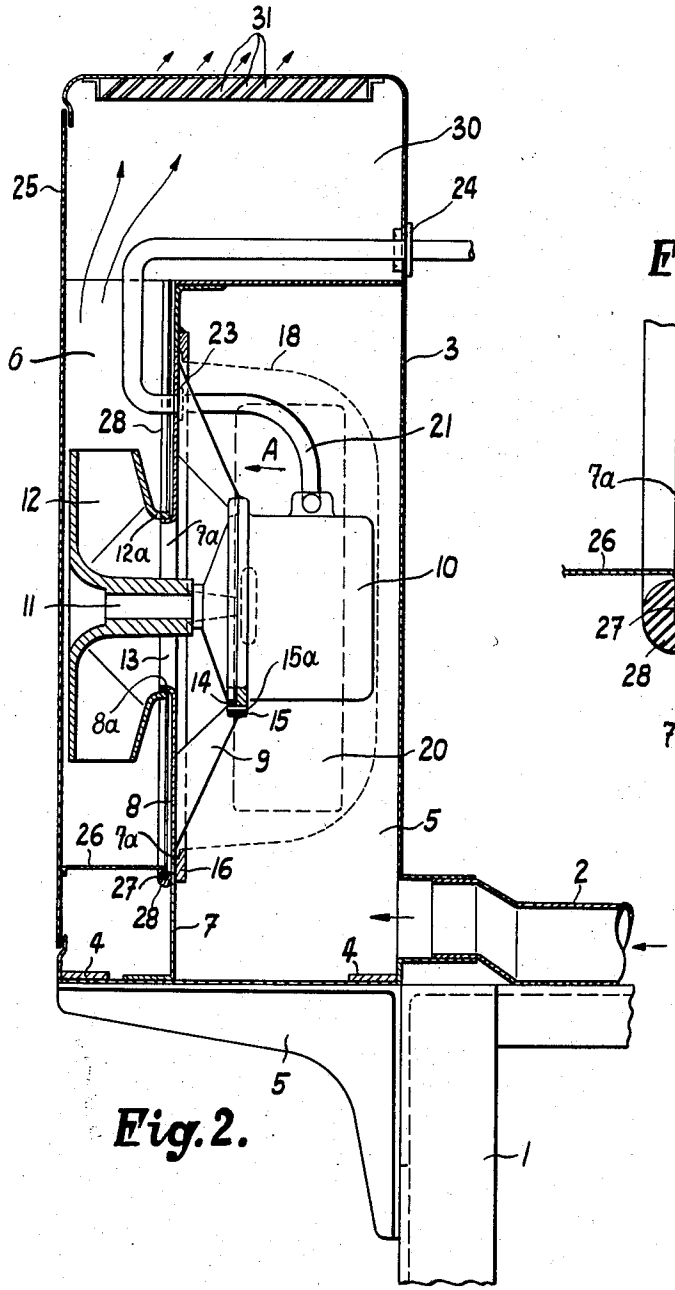
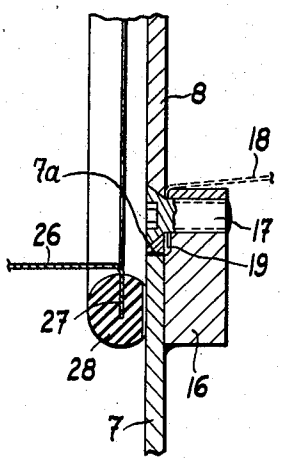


Fig. 2.

Fig. 4.



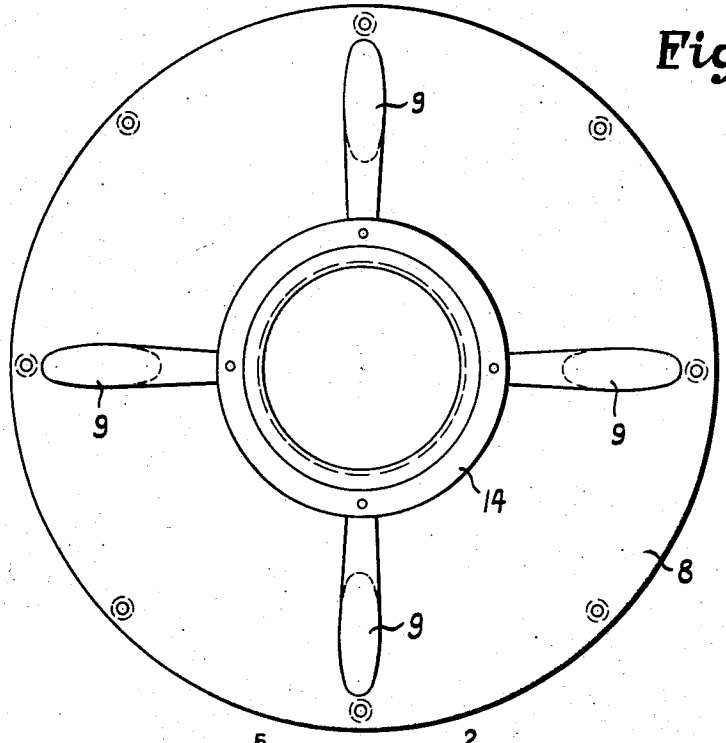
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AIR EXHAUSTING AND FILTERING ARRANGEMENT

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Fig. 3.



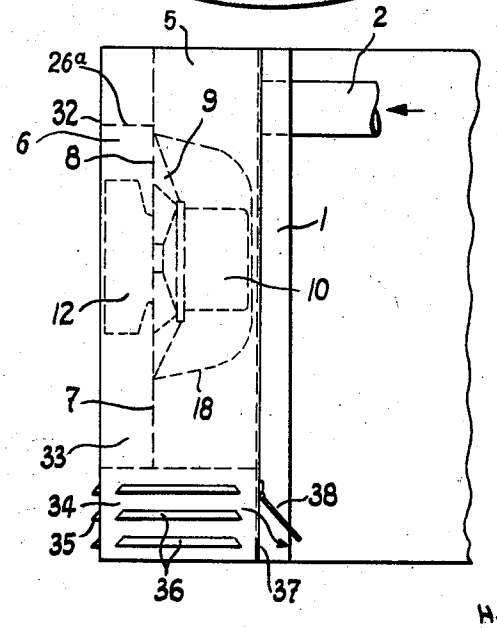


Fig. 5.

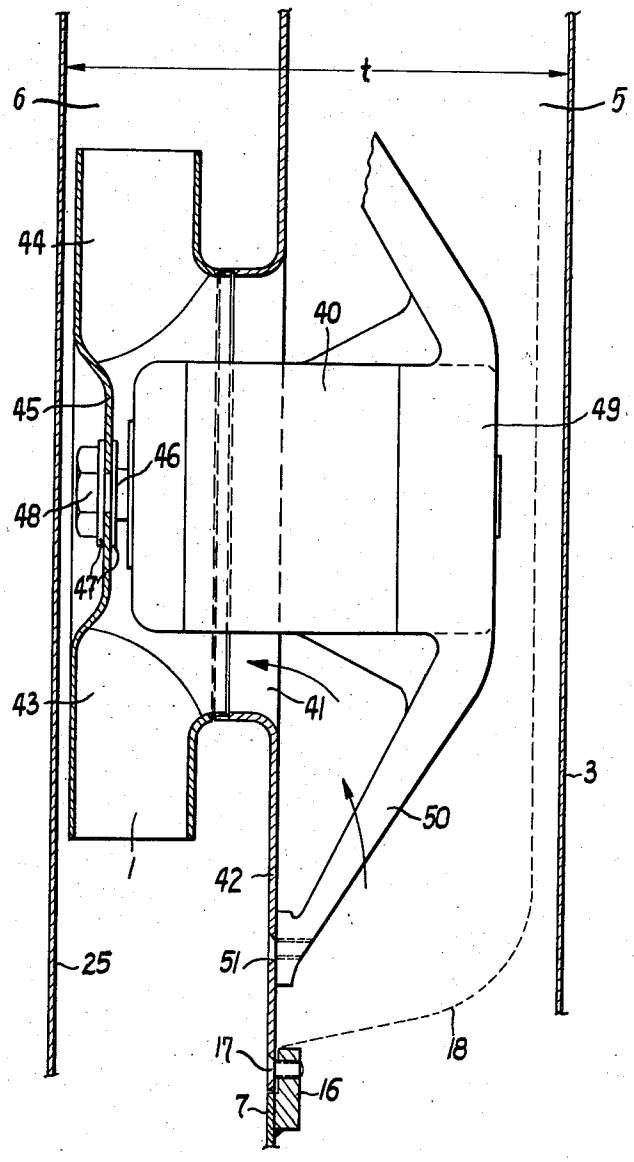
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AIR EXHAUSTING AND FILTERING ARRANGEMENT

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Fig. 6.



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AIR EXHAUSTING AND FILTERING ARRANGEMENT

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Application October 20, 1955, Serial No. 541,802

Claims priority, application Germany April 25, 1955

10 Claims. (Cl. 183—37)

The present invention relates to air exhausting and filtering arrangements, and more particularly to an air exhausting and filtering arrangement for sucking broken thread ends from a spinning machine.

It is known to provide a filter box on the frame of a spinning machine and to support an exhauster unit comprising an electric motor and an impeller wheel on one of the outer walls of the filter box. The constructions according to the known art require very strong walls of the filter box, or the provision of reinforcing elements. Nevertheless, the known arrangements do not work satisfactorily since the unbalanced load on the filter box produces undesirable oscillations. Moreover, it is difficult to assemble and disassemble the filter box arrangements according to the known art.

It is one object of the present invention to overcome the disadvantages of the known air exhausting and filtering arrangements and to provide an air exhausting and filtering arrangement which is free of oscillations.

It is another object of the present invention to provide an air exhausting and filtering arrangement which can be easily assembled and disassembled.

It is a further object of the present invention to provide an air exhausting and filtering arrangement having an easily accessible filter element.

It is an important object of the present invention to provide an air exhausting and filtering arrangement for a spinning machine comprising an exhauster unit mounted on a partitioning wall dividing a filter box into a suction chamber and a pressure chamber.

It is also an object of the present invention to provide a filter box arrangement for a spinning machine in which the exhauster unit is supported on a partitioning wall substantially in the center of gravity of the exhauster unit.

With these objects in view, the present invention mainly consists in an air exhausting and filtering arrangement which is preferably used for sucking the broken thread ends from a spinning machine. The arrangement according to the present invention preferably comprises a filter box housing divided by partitioning wall means into two chambers communicating through an opening in the partitioning wall means; air inlet means and air outlet means on the filter box housing and communicating, respectively, with the chambers, one chamber communicating through the air inlet means with suction devices on the spinning machine; a filter element covering the opening in the partitioning wall means; and an exhauster unit supported on the partitioning wall means and being separated by the filter element from the air inlet means and from the suction devices on the spinning machine. Consequently, thread ends and other impurities are prevented by the filter element from reaching the exhauster unit which preferably includes an electric motor and an impeller wheel.

According to the preferred embodiment of the present

invention, a supporting member is detachably secured to the partitioning wall means and supports the motor of the exhauster unit on supporting legs. The exhauster unit extends through the opening in the partitioning wall and is preferably so arranged that the center of gravity is located close by the plane of the partitioning wall. By this arrangement, bending moments exerted by the weight of the exhauster unit on the supporting partitioning wall are prevented, and the load exerted on the filter box housing is symmetrically distributed so that a particularly quiet running of the exhauster unit is obtained and oscillations are almost completely suppressed.

In the arrangement of the present invention, the filter box housing can be constructed of thin walls, and only the partitioning wall must be somewhat stronger to support the exhauster unit.

Preferably, one of the walls of the filter box is a detachable closure means so that the exhauster unit and the filter element are easily accessible and can be removed from the filter housing by detaching the supporting member from the partitioning wall.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a front view of an embodiment of the present invention;

Fig. 2 is a cross-sectional view taken on line II—II of Fig. 1;

Fig. 3 is a front view of a detail on an enlarged scale taken in the direction of the arrow 3 in Fig. 2;

Fig. 4 is a fragmentary cross-sectional view on an enlarged scale of a detail of an embodiment shown in Fig. 2;

Fig. 5 is a side view of a modified embodiment of the present invention; and

Fig. 6 is a fragmentary sectional view of another modified embodiment of the present invention.

Referring now to the drawings, and more particularly to Figs. 1–4, the end plate of the spinning machine 1 supports a filter box 3 consisting of thin sheets and having a bottom reinforced by bars 4. The filter box 3 is supported on the end plate of the spinning machine by brackets 5. One of the walls of the filter box 3 is detachable and constitutes a closure means 25, which is secured by screws or other attaching means, not shown, to the main portion of the filter box 3. A partitioning means 7 is provided in the filter box 3 and defines in the same a suction chamber 5 and a pressure chamber 6 having an upper portion 30. The partitioning wall 7 has an opening 7a into which an annular member 8 is inserted as best seen in Fig. 4. A supporting ring 16 is welded to the partitioning wall 7, and the annular member 8 is secured to the supporting ring 16 by screws 17. A filter element in the form of a dished filter basket 18 has a flange 19 which is clamped between the annular member 8 and the supporting ring 16. The filter basket 18 defines a space in the suction chamber 5 which communicates through the central opening 13 in the annular member 8 with the pressure chamber 6. The annular member 8 is fixedly connected to a plurality of supporting legs 9 which project obliquely into the space defined by the filter basket 18. In the embodiment shown in Figs. 1, 2, and 3, the ends of the supporting legs 9 are connected by a ring 14 on which an exhauster unit is mounted.

The exhauster unit comprises an electric motor 10, a shaft 11 projecting through the central opening 13 in the

annular member 8, and an impeller wheel 12 mounted on the free end of shaft 11 and located in the pressure chamber 6. The annular inlet of the impeller wheel 12 is bounded by an annular wall 12*a* sliding on an annular flange 8*a* of the annular member 8. Consequently, the inlet of the impeller 12 communicates with the space defined by the filter basket 18 in the suction chamber 5, and sucks air through the inlet means 2, the suction chamber 5 and the filter element 18. The air is expelled through the outlet of the impeller wheel 12 into an air duct 26, 29 and passes from there into the upper portion 30 of the pressure chamber 6 from where it escapes through slots 31. The motor 10 has a flange 15 provided with bores 15*a* which are aligned with bores in the ring 14 so that the exhauster unit can be detachably mounted on the ring 14 which is part of the supporting member 8, 9, 14.

The filter box is provided with two lateral openings closed by covers 20 as best seen in Fig. 1, permitting access to the filter basket 18 for cleaning purposes.

The cable 21 is connected to the terminal 22 of the motor 10 and is located within the space defined by the filter basket 18. The cable 21 passes through an opening in the annular member 8 and is supported by a sleeve 23 provided with a suitable packing. The cable 21 passes then through the pressure chamber 6, 30 and a sleeve 24 to the outside, where it is connected to a switch and to a source of electric current. The above-mentioned air duct is formed by a spiral-shaped guide wall means 26, 29 best seen in Figs. 1 and 2, which is secured to the closure wall means 25 and is provided with a sealing means 28 mounted on the flanged edge 27 of the guide wall 26, 29. The sealing means 27 air-tightly engages the partitioning wall 7 when the closure means 25 is attached to the filter box 3 in closing position so that the closure wall means 25, the partitioning wall means 7, the annular member 8, and the guide wall 26, 29 define an outlet air duct communicating with the upper portion 30 of the pressure chamber.

Due to the dished shape of the filter basket 18, the motor 10 can be at least partly arranged in the suction chamber 5 while being protected from dust, lint and thread ends. The dished construction of the filter element also results in a very large filtering surface so that no clogging of the filter element by retained broken threads occurs even after prolonged use, which would result in decrease efficiency of the exhauster unit.

Due to the fact that the motor is at least partly arranged in the suction chamber 5, the center of gravity of the exhauster unit 10, 12 can be so arranged with respect to the partitioning wall 7 that a minimum of oscillations is caused.

The arrangement of the present invention permits easy access to the filter element and to the exhauster unit without requiring the removal of the filter box from the spinning machine frame 1. When the closure means 25 is detached, the impeller wheel 12 is freely accessible, and when the screws 17 are removed, the entire exhauster unit can be pulled out of the filter box in the direction of the arrow *a*. The filter basket 18 is removed in the same manner.

In the modified embodiment of the present invention shown in Fig. 5, the filter box 32 is supported on the floor and its rear wall abuts against the end plate 1 of the spinning machine. In this embodiment, the air inlet means 2, which communicates with the suction device of the spinning machine, communicates with the upper portion of the suction chamber 5 defined by the partitioning wall 7 in the filter box 32. The position of the guide wall 26*a* is reversed as compared with the embodiment of Figs. 1–4, so that the outlet 33 of the air duct defined by guide wall 26*a* is downwardly directed and communicates with an air distributing chamber 34 located in the bottom portion of the filter box 32. Slots 35 and 36 are provided in the walls of the filter box to permit escape of air from the distributing chamber 38. In addition thereto, an air outlet 37 is provided which is normally closed by a pivoted lid 38. In the event that the slots 35 and 36 are accidentally closed by boxes or baskets placed on the floor adjacent the filter box, the air can still escape by forcing the lid 38 open against the action of the force of gravity. The arrangement of the exhauster unit 10, 12, and of the filter basket 18 in the embodiment of Fig. 5 corresponds to the construction described with reference to Figs. 1–4.

The modified embodiment illustrated in Fig. 6 corresponds to the embodiment shown in Figs. 1 and 2 as far as the general construction of the filter box is concerned. The annular member 42 is secured by screws 17 to the supporting ring 16 which is welded to the partitioning wall 7. In contradistinction to the arrangement shown in Figs. 1 and 2, the supporting legs 50 are detachably secured to the annular member 42 by screws 51, and are an integral part of an end cover plate 49 of the motor housing enveloping the motor 40. The motor 40 is partly located in the suction chamber 5, and partly located in the pressure chamber 6 so that the motor casing extends through the central opening 41 of the annular member 42.

The outer wall 44 of the impeller wheel 43 has an inwardly dished central portion 45 which is supported on the shaft 46 of the motor 40 and secured to shaft 46 by discs 47 and a nut 48 which presses the discs 47 and the dished central portion 45 against a shoulder in shaft 46. Due to this arrangement, the impeller wheel needs no hub. The air passes in the direction of the arrows through the filter basket 18, between the supporting legs 50, through the central opening 41 into the inlet of the impeller wheel 43 from where it is discharged into the pressure chamber 6.

The arrangement according to Fig. 6 permits a particularly flat construction of the filter box 3 since the axial length of the exhauster unit is considerably decreased due to the fact that the motor partly projects into the impeller wheel. The distance *t* is, for instance, 10 inches. The arrangement shown in Fig. 6 has the additional advantage that the center of gravity of the motor-impeller unit can be easily arranged in the plane of the partitioning wall 7 so that oscillations are reduced, and a comparatively thin partitioning wall 7 is sufficient for supporting the exhauster unit.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of air exhausting and filtering arrangements differing from the types described above.

While the invention has been illustrated and described as embodied in a filter box for a spinning machine including a partitioning wall supporting an exhauster unit, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. Exhaustive and filtering arrangement for a spinning machine and comprising, in combination a housing having an aperture and including a detachable closure means closing said aperture, said housing being adapted to be secured to the spinning machine with said aperture located remote from said spinning machine; upright par-

titioning wall means located in said housing and having an opening located opposite said aperture, said partitioning wall means defining in said housing two chambers connected by said opening; air inlet means on said housing communicating with one of said chambers and adapted to communicate with a thread ends sucking device of the spinning machine; air outlet means on said housing communicating with the other of said chambers; a supporting member including an annular member located in the region of said opening, and supporting legs; attaching means detachably securing said annular member to said partitioning wall means; a dished filter basket secured to said annular member and located in said one chamber; an exhauster unit passing through said annular member and said opening and including an electric motor supported on said legs at least partly located within said filter basket in said one chamber, and an impeller wheel located in said other chamber, the center of gravity of said exhauster unit being substantially located in the plane of said partitioning wall means; and a spiral-shaped guide wall fixedly secured to said closure means and transversely projecting from the same into said other chamber, said guide wall having a free edge in sealing engagement with said partitioning wall and defining with said closure means and said partitioning wall a spiral-shaped pressure case for said impeller wheel, said pressure case communicating with said outlet means whereby upon removal of said closure means with said spiral shaped guide wall, said supporting member together with said exhauster unit can be removed from said housing through said aperture.

2. An apparatus as set forth in claim 1 wherein said attaching means are screws.

3. An apparatus as set forth in claim 1 wherein said motor is partly located in said other chamber and passes through said annular member.

4. An apparatus as set forth in claim 3 wherein said motor has a free shaft end portion located in said other chamber; wherein said impeller wheel has a dished center portion; and including threaded means securing said dished center portion to said shaft end portion.

5. An apparatus as set forth in claim 1 wherein said motor has a casing including an end member located in said one chamber remote from said partitioning wall and adapted to face toward the spinning machine, and wherein said legs are secured to said end member.

6. An apparatus as set forth in claim 1 wherein said opening in said partitioning wall means is bounded by an annular edge, and wherein said annular member is located in said opening and has an annular outer edge abutting against said annular inner edge of said opening.

7. Exhausting and filtering arrangement for a spinning machine and comprising, in combination, a housing having an aperture and including a detachable closure means closing said aperture, said housing being adapted to be secured to the spinning machine with said aperture located remote from said spinning machine; upright partitioning wall means located in said housing and having an opening located opposite said aperture, said partitioning wall means defining in said housing a first chamber communicating with said aperture, and a second chamber connected to said first chamber by said opening; air inlet means on said housing communicating with said second chamber and adapted to communicate with a sucking device of the spinning machine; air outlet means on said housing communicating with said first chamber; an annular supporting member located in said opening and having a central opening; attaching means for attaching said annular supporting member to said partitioning wall means for closing said opening in the same so that said chambers communicate through said central opening in said annular supporting member; a dished filter basket secured to said annular supporting member and located in said second chamber covering said central opening to separate said inlet means from said central opening; and

an exhauster unit including an electric motor having a shaft at one end, and a casing enclosing said motor and having at the other end of the same a plurality of outwardly extending legs secured to said annular supporting member, said casing and said motor passing through said central opening with one part of said casing and motor located within said filter basket in said second chamber, and another part of said casing and motor located in said first chamber, said exhauster unit further including an impeller wheel located in said first chamber and secured to said shaft, said impeller wheel having an annular inner portion surrounding said central opening in said annular supporting member, and said other part of said casing projecting into said impeller wheel, said exhauster unit being supported by said legs in a position in which the center of gravity thereof is substantially located in the plane of said partitioning wall means, and in which said exhauster unit is located opposite said aperture and said closure means so that upon removal of said closure means, said annular supporting member and said exhauster unit can be removed through said aperture from said housing.

8. Exhausting and filtering arrangement for a spinning machine and comprising, in combination, a housing having an aperture and including a detachable closure means closing said aperture, said housing being adapted to be secured to the spinning machine with said aperture located remote from said spinning machine; upright partitioning wall means located in said housing and having an opening located opposite said aperture, said partitioning wall means defining in said housing a first chamber communicating with said aperture, and a second chamber connected to said first chamber by said opening; air inlet means on said housing communicating with said second chamber and adapted to communicate with a sucking device of the spinning machine; air outlet means on said housing communicating with said first chamber; an annular supporting member located in said opening and having a central opening; attaching means for attaching said annular supporting member to said partitioning wall means for closing said opening in the same so that said chambers communicate through said central opening in said annular supporting member; a dished filter basket secured to said annular supporting member and located in said second chamber covering said central opening to separate said inlet means from said central opening; an exhauster unit including an electric motor having a shaft at one end, and a casing enclosing said motor and having at the other end of the same a plurality of outwardly extending legs secured to said annular supporting member, said casing and said motor passing through said central opening with one part of said casing and motor located within said filter basket in said second chamber, and another part of said casing and motor located in said first chamber, said exhauster unit further including an impeller wheel located in said first chamber and secured to said shaft, said impeller wheel having an annular inner portion surrounding said central opening in said annular supporting member, and said other part of said casing projecting into said impeller wheel, said exhauster unit being supported by said legs in a position in which the center of gravity thereof is substantially located in the plane of said partitioning wall means, and in which said exhauster unit is located opposite said aperture and said closure means; and a spiral-shaped guide wall fixedly secured to said closure means and transversely projecting from the same into said first chamber, said guide wall having a free edge in sealing engagement with said partitioning wall means around said opening in the same and defining with said closure means and said partitioning wall a pressure case for said impeller wheel communicating with said outlet means so that upon removal of said closure means and guide wall, said annular supporting member and said exhauster unit can be removed through said aperture from said housing.

9. An arrangement as set forth in claim 7 and including a ring fixedly secured to said partitioning wall and extending around said opening in the same; wherein said annular supporting member has an outer annular peripheral edge abutting on the annular inner edge of said opening in said partitioning wall means; and wherein said attaching means including screws securing said annular supporting member to said ring.

10. An arrangement as set forth in claim 7 wherein said impeller wheel has a dished center portion; and including threaded means securing said dished center portion to said shaft.

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