Feb. 15, 1966 D. G. COWLIN 3,234,715

LINT COLLECTOR

Filed March 12, 1962 2 Sheets-Sheet 1

Fig. 2

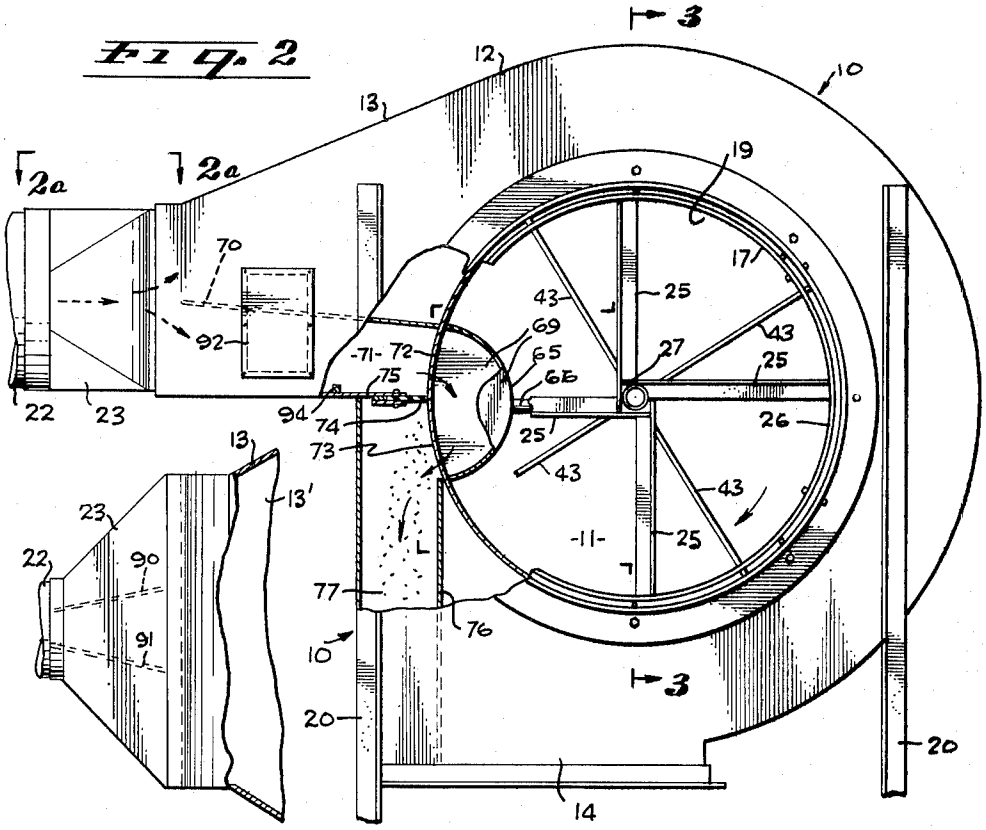


Fig. 2a

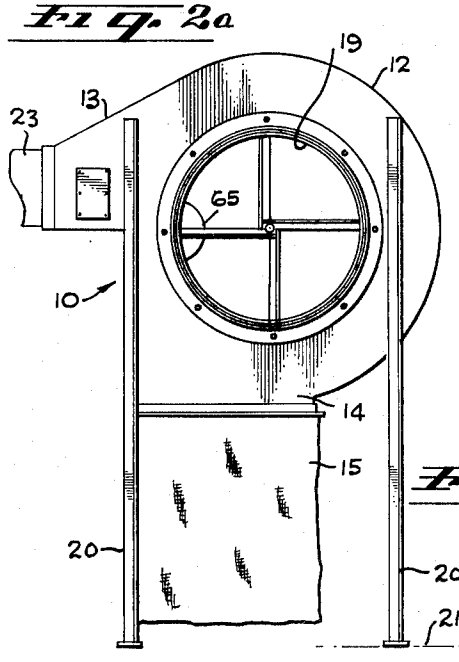


Fig. 7

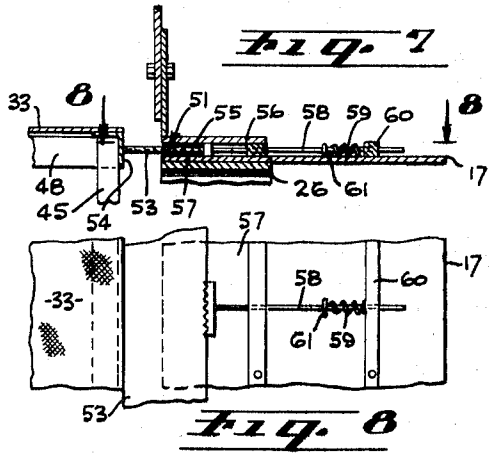


Fig. 8

Fig. 1

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LINT COLLECTOR

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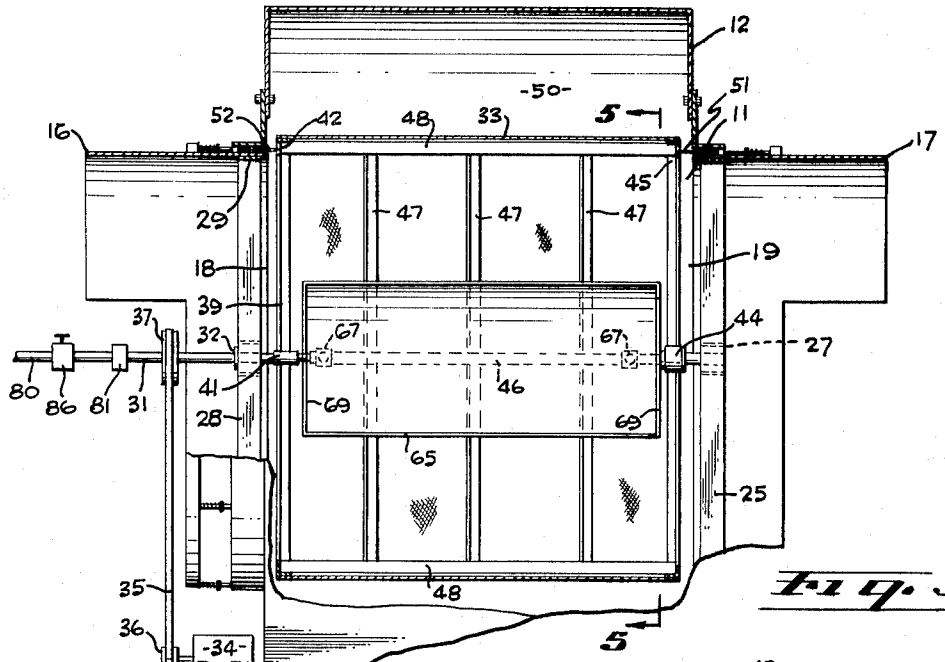


Fig. 3

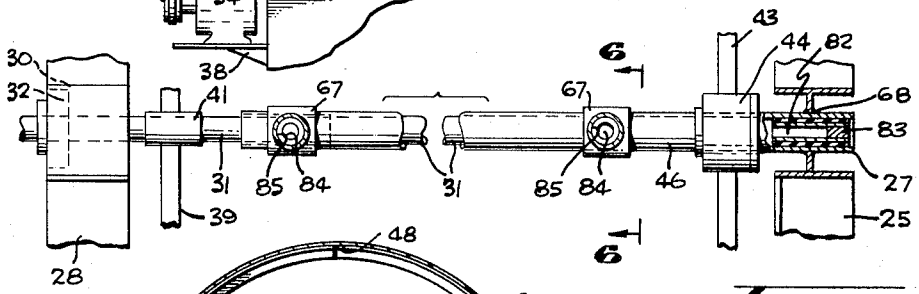


Fig. 4

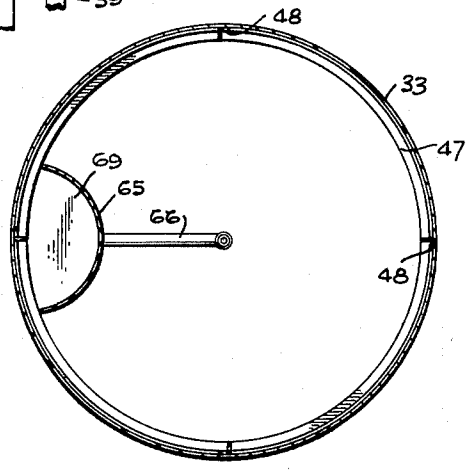


Fig. 5

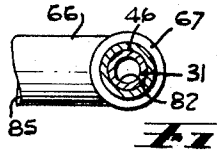


Fig. 6

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3,234,715

LINT COLLECTOR

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Filed Mar. 12, 1962, Ser. No. 178,899
6 Claims. (Cl. 55—302)

The application relates to machinery used in connection with laundries and cleaning establishments and has special reference to a device capable of separating lint from air discharged from the laundry area and machines within the area so that the lint can be collected and so that the air which is initially laden with lint is cleaned prior to being exhausted to the atmosphere.

For a long time laundries and cleaning establishments have had to face the problem of collecting lint when air is discharged from the premises and machines on the premises to the atmosphere. Various means have been attempted to accomplish this which have ranged from the employment of simple porous bags through which the lint-laden air is passed to elaborate washing equipment directed to the precipitation of lint from the air and the cleaning of air before it is discharged. Various drawbacks have accompanied lint-removing expedients of the type herein suggested. For example, when a porous bag is used having a mesh fine enough to separate out the usual finer particles of lint, the mesh must be sufficiently tight to do this and as a result a considerable back pressure is built up in the discharge line from the laundry premises. If the mesh is sufficiently open to avoid building up undesirable back pressure, then an objectionable amount of lint actually passes through the wall of the bag.

In the case of cleaners employing water, there is the constant objection to lint-laden water spilling from the containers and producing dirty-appearing premises. Water cleaners also have the usual objection of building up too much back pressure in discharge lines from the premises. Further still, the lint-separating and retrieving equipment of the type heretofore available has been such that they have been prone to become clogged, necessitating frequent cleaning. This, of course, is objectionable because when the machinery is opened up for cleaning, the laundry operation must stop until the machinery can be set back in operation.

It is therefore among the objects of the invention to provide a new and improved lint collecting device which produces relatively little back pressure in the line from the laundry premises and which at the same time is especially effective in removing virtually all lint from air which is discharged before the air is released to the surrounding atmosphere.

Another object of the invention is to provide a new and improved lint collector which is self-cleaning so that the device can be run continuously for long periods of time without need of its being shut down for cleaning purposes.

Another object of the invention is to provide a new and improved lint collector which is effective, continuous and self-cleaning and which, moreover, is of such construction that it can be readily modified for exhaust lines of various capacities and pressures without needing any major alteration in the equipment.

Still another object of the invention is to provide a new and improved lint collector which not only sets up a minimum degree of back pressure in exhaust ducts from laundry and cleaning premises but which also operates at such slow speed as to be noiseless and virtually free of vibration.

A further object of the invention is to produce a highly

efficient self-cleaning lint collector which is capable of making use of pressure present in lint-laden ducts from the laundry premises as its self-cleaning expedient, thereby to substantially simplify the operation of the cleaner and to minimize the cost of operation.

Also included among the objects of the invention is to provide a lint collector which operates dry and thereby avoids the detrimental effects of the accumulation which are invariably present in cold climates when wet systems are made use of.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a side elevational view of the lint collector set up and ready for operation.

FIGURE 2 is a side elevational view of the lint collector drawn to a slightly larger scale and partially broken away to reveal the interior construction.

FIGURE 2*a* is a fragmentary plan view taken on the line 2*a*—2*a* of FIGURE 2.

FIGURE 3 is a fragmentary vertical sectional view taken on the line 3—3 of FIGURE 2.

FIGURE 4 is a fragmentary cross-sectional exploded view of the shaft construction within the interior of the device.

FIGURE 5 is a cross-sectional view taken on the line 5—5 of FIGURE 3.

FIGURE 6 is a fragmentary cross-sectional view taken on the line 6—6 of FIGURE 4.

FIGURE 7 is a fragmentary cross-sectional view of one of the means for pressing a rotary seal in position.

FIGURE 8 is a fragmentary plan view taken on the line 8—8 of FIGURE 7.

In an embodiment of the invention chosen for the purpose of illustration the lint collector is contained within a housing indicated generally by the reference character **10**. The housing has a chamber **11** therein and more particularly the housing comprises a body portion **12** on the left side of FIGURES 1 and 2 of which is section **13** containing an inlet passage **13'** by means of which lint-laden air is supplied to the chamber **11**. A discharge section **14** on the lower side is fitted to accommodate a lint-collecting bag **15**. Weather hoods **16** and **17** at opposite ends shield outlet passages **18** and **19** through which clean air escapes to the atmosphere. The housing is supported upon legs **20** above an appropriate supporting surface **21**. A discharge duct **22** such as is customarily employed to carry lint and moisture-laden air from a laundry premises and machines on the premises feeds into the section **13** through a baffle box **23**.

In each outlet passage, as for example, in the passage **19**, there is mounted a spider comprising legs **25** secured at outer ends to a ring **26** forming part of the housing. At the inside end the legs join in a bushing **27**. Similarly, at the opposite end, legs **28** are secured at their outside ends to a ring **29** and at their inside ends to a bushing **30**. A shaft **31** is rotatably mounted on appropriate bearings **32**, respectively, in the bushings **27** and **30**. Occupying a substantial portion of the chamber **11** within the body portion **12** of the housing is a cylindrical screen **33** which is designed to be rotated in position by rotation of the shaft **31** powered by a motor **34** connected to the shaft by a belt **35** and pulleys **36** and **37**, the motor being carried upon a suitable bracket **38** on a lower portion of the housing.

To secure the screen **33** to the shaft **31** struts **39** at the left end of the screen, as viewed in FIGURES 3 and 4,

are secured to a collar 41 which in turn is non-rotatably fastened to the shaft 31. Outer ends of the struts are made fast to an annular end ring 42 forming part of the frame of the screen. In a somewhat similar fashion struts 43 at the opposite or right-hand end, as viewed in FIGURES 3 and 4, are jointed at inner ends to a collar 44 and at outer ends to an end ring 45 of the screen frame. The collar 44, however, instead of being secured to the shaft 31 rotates about a hollow fixed shaft 46. Accordingly, the torque which is exerted upon the collar 41 by the shaft 31 being the driven shaft is supplied entirely through the struts 39 to the screen at the left end, the right end merely rotating free. Intermediate rings 47 of the screen support longitudinal angle sections 48 over which the mesh of the screen is smoothly applied, as indicated to good advantage in FIGURES 3 and 5. A screen having a mesh sufficiently fine to filter out virtually all of the pieces of lint is desirable, although the mesh should not be so fine as to create an undesirable back pressure in the discharge duct 22, since some of the finer lint particles will be precipitated out within the chamber and ultimately be collected by the walls of the bag 15. Mounted as shown and described the screen defines an arcuate space 50 between the exterior of the screen and the interior of the body portion 12 of the housing.

At each end of the screen is a rotary seal indicated at the right end of FIGURE 3 by the reference character 51 and at the left end by the reference character 52. The seal in each instance is of identical construction so that a description of one will suffice for both. To form the seal an annular cylindrical flexible ring 53 is mounted so as to bear in sliding relationship on an outside face 54 of the end ring 45 of the screen. The flexible ring is contained in an annular slot 55 between a sleeve 56 and a sleeve 57 secured to the outer portion of the ring 26. Pressure blocks on pins 58 press against the outer edge of the flexible ring, being forced by action of the spring 59 in each instance. The spring acts at one end against a boss 60 and at the other end against a cross-pin 61 on the pin 58. There may be as many as three, four or more such pressure blocks spaced circumferentially around the flexible ring at each end to make certain that there is always a sliding seal between the face 54 and the inner edge of the flexible ring.

The path of lint-laden air through the housing in the embodiment shown is from the discharge duct 22 through the inlet passage 13' to the arcuate space 50, thence through the mesh of the screen 33 to the interior of the screen and then outwardly to the atmosphere through the outlet passages 18 and 19. Since there is an appreciable pressure drop as air from the relatively small discharge duct 22 empties into the chamber 11 which is of relatively large volume, a substantial portion of the lint will precipitate out and fall downwardly through the discharge section 14 into the bag 15. Some air will also pass outwardly in this direction and ultimately out through the open mesh of the wall of the bag. Air, however, which passes through the mesh of the screen is in considerable volume and during its passage will deposit upon the exterior of the screen quantities of lint. Accordingly, it becomes necessary to constantly clear the surface of the screen. To accomplish this a casing 65 is mounted adjacent the inside wall of the screen and supplied with air under pressure so that air is directed outwardly with respect to the casing through the mesh in the screen in reverse direction, thereby to blow lint clean of the outside at each revolution of the screen.

To facilitate the placing and operation of this cleaning technique, the casing is mounted upon arms 66 which are securely fastened to the hollow fixed shaft 46 at the collars 67 by some conventional means such as set screws. In order that the shaft 46 be fixed in position, it extends outwardly to the bushing 27 at the right end of the housing, as viewed in FIGURES 3 and 4, and is welded to

the bushing by welds 68. The shaft 46 is otherwise supported upon the shaft 31 which it surrounds with a free rotating fit so that the shaft 31 can freely rotate within the hollow fixed shaft.

Reference has already been made to the mounting of the collar 44 on the exterior of the fixed shaft so that at this particular point the collar 44 rotating about the fixed shaft supports the respective end of the screen on a rotatable mounting. The somewhat unusual structure just described makes it possible to keep the entire area of the outlet passages practically clear for the passage of clean air outwardly at both ends. Hence, the outlet passages can be large in area and offer virtually no obstruction to the flow of air.

In the chosen embodiment of the invention the casing 65 is made with its long wall arcuate in form as shown and with plates 69 closing the ends. The casing is mounted close to the inside surface of the screen but slightly clear of contact so as to not interfere with the free rotation of the screen. A baffle 70 which is generally horizontal and extending entirely across the inlet passage 13 divides the flow of air through the inlet passage so that part of the air is deflected through an auxiliary passage 71. Air from this passage passes through a section 72 of the mesh of the screen and impinges upon the curved bottom of the casing 65 whereby the direction of the air flow is reversed and passed outwardly through a cleaning section 73 of the screen. A flexible separator 74 which is a flexible band having a sliding engagement with the exterior of the screen is secured to a stationary extension 75 on the interior of the housing. The separator is designed to extend for the full length of the screen. It has also been found advantageous to employ a channel baffle 76, the upper edge of which coincides with the lower edge of the casing 65, thereby defining the area of the section 73 as between the upper edge of the channel baffle 76 and the inner edge of the separator 74.

As previously mentioned, lint is deposited upon the exterior of the mesh of the screen by air passing through it from the arcuate space 50. The screen is designed to rotate at a relatively low speed, as low as nine revolutions per minute. As the circumference of the screen approaches the separator 74, which can be identified aptly as the approach side of the inlet passage, when each succeeding portion of the circumference reaches the cleaning section 73, air deflected by the casing 65 outwardly through the screen blows the lint from the exterior and this lint falls through a channel passage 77 defined by the channel baffle 76 and drops into the bag 15. The lint is, of course, accompanied by the air which is deflected and which dislodges it from the screen. Consequently, as the circumference of the screen reaches and passes the separator 74, it is entirely clear of lint which previously accumulated upon it. Only a relatively small portion of lint will accumulate on the screen at the section 72 and hence there will be ample opportunity for air to pass into the screen at this point in the manner heretofore described. The direction of rotation of the screen is indicated by arrow in FIGURE 2 of the drawings.

Under some special circumstances where, for example, there may be an especially heavy load of lint or perhaps where the lint may have a heavy proportion of very fine particles, some auxiliary air supply may be found desirable for the casing 65. This additional air can be supplied from an air pressure line 80 connected through a swivel fitting 81 of some conventional construction to the shaft 31, the shaft 31 being hollow and providing a central air passage 82 therethrough. A plug 83 closes the outer or left-hand end of the air passage. Holes 84, as shown in FIGURE 4, admit air to passages 85 in the arms 66, the passages 85 opening into the interior of the casing 65. When this auxiliary air supply under pressure is desired, the supply may be turned on by manipulation of a conventional valve 86.

It should be understood further that on some occasions the auxiliary air supply alone may be sufficient to keep the surface of the screen clean. Should this expedient only be employed, the casing 65 need not be supplied by the auxiliary passage 71. Hence, the casing can be made smaller so as to open only throughout the area of the cleaning section 73 or the identical casing may be reset in position, shifted a slight distance counterclockwise, as viewed in FIGURE 2, so that the upper edge of the casing approximately coincides with the edge of the separator 74 and the lower edge takes its natural position directed generally toward the discharge section 14.

It will also be understood that on some occasions relatively heavy materials also find their way through the discharge duct like, for example, buttons, sections of cloth, and other objects. By providing the baffle box 23 equipped, if desired, with baffles 90 and 91, with a cross-sectional area substantially greater than the cross-sectional area of the discharge duct 22 at this first approach of the discharge air to the housing there will be a change in velocity sufficient to cause heavy particles of the kind mentioned to drop out and fall to the bottom of the section 13. A trap door 92 may be provided at the side of the section from which such heavier articles can be extracted. A flange 94 is all that may be needed to keep such articles from rolling to a position over the separator 74.

By employment of the apparatus herein described, substantially large volumes of lint-laden discharge air can be accommodated whether lightly or heavily laden with lint and other particles which should be separated. The apparatus works with equal effectiveness whether the discharge air be damp and heavily laden with moisture or relatively dry and is unaffected adversely by either hot or cold air. By confining moving parts to concentric shafts located at the mid-area, the apparatus is one which impedes the flow of air both lint-laden and clean air to the least degree. The moving parts, moreover, by reason of their location and protected condition are not subject to becoming clogged by the operation and hence will need no more than a very modest amount of servicing. The operation, moreover, is one which can run continuously, being self-cleaning, and need only be stopped long enough to change bags when one of the bags 15 becomes full.

While the invention has herein been shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described the invention, what is claimed as new in support of Letters Patent is:

1. A lint collector for removing lint entrained in an air stream, comprising: a generally cylindrical housing; a generally cylindrical screen substantially sealed at its opposite ends to said housing and rotatably mounted within said housing for turning on an axis substantially parallel to the axis of said housing, said screen between the sealed opposite ends thereof being radially spaced from said housing; a separator on said housing extending generally radially inwardly therefrom into sliding relationship with the outer surface of said screen and extending axially of said housing substantially the full length of said screen, said screen and housing defining therebetween an arcuate chamber extending about said screen between the sealed opposite ends thereof, and which terminates circumferentially at one end thereof on one side of said separator and terminates circumferentially at the other end thereof on the opposite side of said separator, said housing having an air inlet passage opening to said one end of said arcuate chamber, and a clean air outlet communicating to the interior of said screen; means defining a lint discharge passage at the other end of said chamber, one end of said discharge passage opening adjacent said screen and toward the opposite side of said separator to receive lint discharged from said screen, and the other end thereof opening to the exterior of said housing for communication to a lint receiver, said separator causing air entering said arcuate chamber through said inlet passage to flow circumferentially around said screen only in the direction from said one end towards said other end of said arcuate chamber; means for rotating said screen in said direction; a hollow stationary casing within and extending substantially the full length of said screen; means mounting said casing on said housing and adjacent to the inner surface of said screen; and means for conveying air under pressure to the interior of said casing, said casing having an open side facing said screen at said opposite side of said separator and directing air through said screen for blowing lint therefrom into said lint discharge passage.

2. A lint collector for removing lint entrained in an air stream, comprising: a generally cylindrical housing; a generally cylindrical screen substantially sealed at its opposite ends to said housing and rotatably mounted within said housing for turning on an axis substantially parallel to the axis of said housing, said screen between the sealed opposite ends thereof being radially spaced from said housing; a separator on said housing extending generally radially inwardly therefrom into sliding relationship with the outer surface of said screen and extending axially of said housing substantially the full length of said screen, said screen and housing defining therebetween an arcuate chamber extending about said screen between the sealed opposite ends thereof, and which terminates circumferentially at one end thereof on one side of said separator and terminates circumferentially at the other end thereof on the opposite side of said separator, said housing having an air inlet passage opening to said one end of said arcuate chamber, and a clean air outlet communicating to the interior of said screen; means defining a lint discharge passage at the other end of said chamber, said discharge passage having an open end disposed in close proximity to the outer surface of and extending substantially the full length of said screen and which faces toward the opposite side of said separator to receive lint discharged from said screen; means defining a separate lint discharge opening communicating at one end thereof to said other end of said chamber, the other end of said discharge opening and the other end of said discharge passage opening to the exterior of said housing for communication to a lint receiver, said separator causing air entering said arcuate chamber through said inlet passage to flow circumferentially around said screen only in the direction from said one end towards said other end of said arcuate chamber; means for rotating said screen in said direction; a hollow stationary casing within and extending substantially the full length of said screen; means mounting said casing on said housing and adjacent to the inner surface of said screen, said casing being located directly opposite and having an open side facing said open end of said lint discharge passage; and means for conveying air under pressure to the interior of said casing, said casing directing air through said screen for blowing lint therefrom into said lint discharge passage.

3. A lint collector for removing lint entrained in an air stream, comprising: a generally cylindrical housing having a normally horizontal axis; a generally cylindrical screen substantially sealed at its opposite ends to said housing and rotatably mounted within said housing for turning on an axis substantially parallel to said horizontal axis of said housing, said screen between the sealed opposite ends thereof being radially spaced from said housing; a normally generally horizontal separator on said housing extending generally radially inwardly therefrom into sliding relationship with the outer surface of said screen and extending axially of said housing substantially the full length of said screen, said screen and housing defining therebetween an arcuate chamber extending

about said screen between the sealed opposite ends thereof, and which terminates circumferentially at one end thereof on the normally upper side of said separator and terminates circumferentially at the other end thereof on the normally underside of said separator, said housing having an air inlet passage opening to said one end of said arcuate chamber, and a clean air outlet communicating to the interior of said screen; means defining a lint discharge passage at the other end of said chamber, one end of said discharge passage opening adjacent said screen and toward the underside of said separator to receive lint discharged from said screen, and the other end thereof opening through the underside of said housing for communication to a lint receiver, said separator causing air entering said arcuate chamber through said inlet passage to flow circumferentially around said screen only in the direction from said one end towards said other end of said arcuate chamber; means for rotating said screen in said direction; a hollow stationary casing within and extending substantially the full length of said screen; means mounting said casing on said housing and adjacent to the inner surface of said screen; and means for conveying air under pressure to the interior of said casing, said casing having an open side facing said screen at said underside of said separator and directing air through said screen for blowing lint therefrom into said lint discharge passage.

4. A lint collector for removing lint entrained in an air stream, comprising: a generally cylindrical housing having a normally horizontal central axis; a generally cylindrical screen substantially sealed at its opposite ends to said housing and rotatably mounted within said housing for turning on an axis substantially parallel to said horizontal axis of said housing, said screen between the sealed opposite ends thereof being radially spaced from said housing; a normally generally horizontal separator on said housing extending generally radially inwardly therefrom into sliding relationship with the outer surface of said screen and extending axially of said housing substantially the full length of said screen, said screen and housing defining therebetween an arcuate chamber extending about said screen between the sealed opposite ends thereof, and which terminates circumferentially at one end thereof on the normally upper side of said separator and terminates circumferentially at the other end thereof on the normally underside of said separator, said housing having an air inlet passage opening to said one end of said arcuate chamber, and a clean air outlet communicating to the interior of said screen; means defining a lint discharge passage at the other end of said chamber, one end of said discharge passage opening adjacent said screen and toward the underside of said separator to receive lint discharged from said screen, and the other end thereof opening through the underside of said housing for communication to a lint receiver, said separator causing air entering said arcuate chamber through said inlet passage to flow circumferentially around said screen only in the direction from said one end towards said other end of said arcuate chamber; means for rotating said screen in said direction; a hollow stationary casing within and extending substantially the full length of said screen; means mounting said casing on said housing and adjacent to the inner surface of said screen; and means for conveying air under pressure to the interior of said casing, said casing having an open side facing said screen at the underside of said separator and directing air through said screen for blowing lint therefrom into said lint discharge passage, the effective cross-sectional area of said arcuate chamber being substantially greater than the effective cross-sectional area of said inlet passage, whereby the velocity of air entering through said inlet passage is abruptly reduced upon entrance of the air into said chamber.

5. A lint collector for removing lint entrained in an air stream, comprising: a generally cylindrical housing; a generally cylindrical screen substantially sealed at its opposite ends to said housing and rotatably mounted within said housing for turning on an axis substantially parallel to the axis of said housing, said screen between the sealed opposite ends thereof being radially spaced from said housing; a separator on said housing extending generally radially inwardly therefrom into sliding relationship with the outer surface of said screen and extending axially of said housing substantially the full length of said screen, said screen and housing defining therebetween an arcuate chamber extending about said screen between the sealed opposite ends thereof, and which terminates circumferentially at one end thereof on one side of said separator and terminates circumferentially at the other end thereof on the opposite side of said separator, said housing having an air inlet passage opening to said one end of said arcuate chamber, and a clean air outlet communicating to the interior of said screen; means defining a lint discharge passage at the other end of said chamber, one end of said discharge passage opening adjacent said screen and toward the opposite side of said separator to receive lint discharged from said screen, and the other end thereof opening to the exterior of said housing for communication to a lint receiver, said separator causing air entering said arcuate chamber through said inlet passage to flow circumferentially around said screen only in the direction from said one end towards said other end of said arcuate chamber; means for rotating said screen in said direction; a hollow stationary casing within and extending substantially the full length of said screen; and means mounting said casing on said housing and adjacent to the inner surface of said screen, said casing having an open side facing said screen, said inlet passage, and said one end of said discharge passage, and arranged to direct air from said inlet passage through said screen, and then back through said screen into said discharge passage for blowing lint from said screen into said lint discharge passage.

6. A lint collector according to claim 5, including additionally: means for conveying air under pressure to the interior of said casing independently of the air entering said casing from said inlet passage.

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