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LAUNDRY AND FABRIC COLLECTOR AND METHOD
HAVING A CONSTANT VACUUM
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FIG. 1.

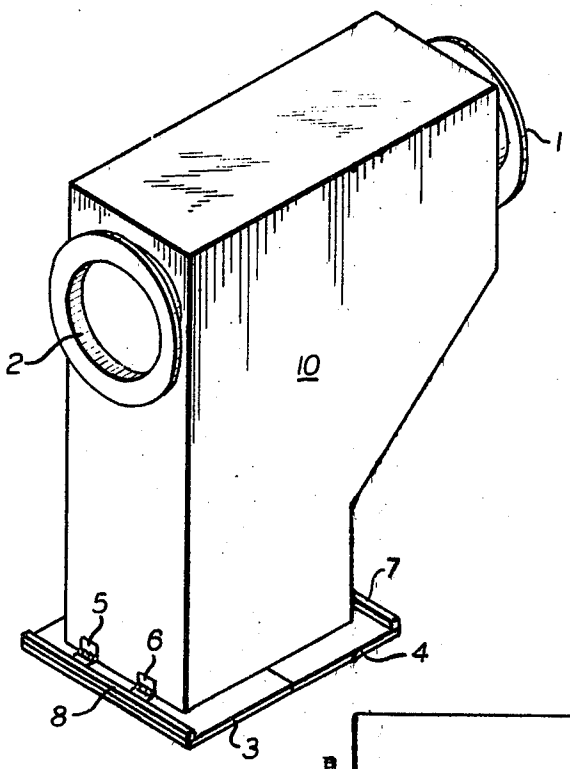
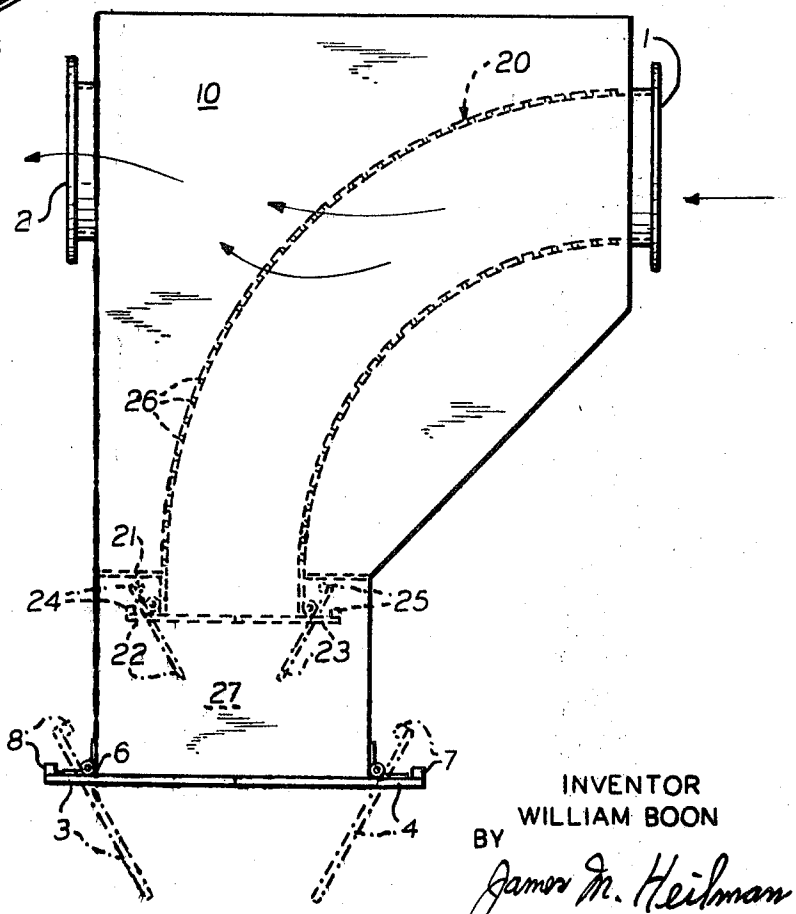



FIG. 2.




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# LAUNDRY AND FABRIC COLLECTOR AND METHOD HAVING A CONSTANT VACUUM

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U.S. Cl. 302—59 11 Claims

## ABSTRACT OF THE DISCLOSURE

The invention comprises a unique laundry and fabric collector assembly and method whereby laundry being conveyed is removed from the system utilizing in combination an inner arrangement of discharge doors and an outer arrangement of discharge doors wherein the respective arrangements are actuated by the weight of the laundry and one set of doors is closed while the other set is opened whereby a constant vacuum or pressure in the system is maintained.

## CROSS-REFERENCE TO RELATED APPLICATIONS

Boon Pats. 2,556,058, June 5, 1951; 3,208,800, Sept. 28, 1965; 3,301,603, Jan. 31, 1967. Boon application Ser. No. 503,272—Filed Oct. 23, 1965 (pending).

The invention comprises a unique laundry and fabric collector assembly and method whereby laundry being conveyed is removed from the system utilizing in combination an inner arrangement of discharge doors and an outer arrangement of discharge doors wherein the respective arrangements are actuated by the weight of the laundry and one set of doors is closed while the other set is opened whereby a constant vacuum or pressure is maintained in the system.

The present invention is concerned generally with a laundry conveying system whereby the conveying medium comprises a vacuum (negative pressure) or positive pressure air system. Laundry and fabric are used interchangeably and are meant to include all types of textile as well as bulky trash, such as newspapers, etc. The invention is more specifically concerned with a novel collector system for the removal of the conveyed laundry from the conveying system without losing air pressure within the system. In accordance with a specific adaptation of the present invention, a first or inner set of release doors is utilized in conjunction with a second set or outer release doors operated under conditions wherein one set of doors is always closed which thereby prevents open communication from without the system to within the system thus preventing loss of vacuum or air pressure from within the system.

It is well known in the art to convey materials in conduits using suitable pressure means in which the conveying medium comprises a fluid stream such as a conveying air stream. Also, in large textile manufacturing plants, laundries, etc., it is necessary that certain fabrics and laundry be removed from the conveying system at predetermined selected stations in order to further process the materials. One problem with respect to systems such as these, is that an excessive loss of conveying air and pressure results at the station or position where the fabrics are removed from the conveying system for processing which substantially increases the costs of operating these systems.

The particular fabric and laundry collector assembly of the present invention may be readily used in any type of air conveying system such as that described in applicant's prior U.S. Pats. 2,556,058, issued June 5, 1951; 3,208,800, issued Sept. 28, 1965; and 3,301,603, issued Jan. 31, 1967.



The apparatus and technique of the present invention may be fully understood by reference to the drawings illustrating one embodiment of the same. FIG. 1 is an overall view of the collector assembly while FIG. 2 illustrates in some detail the inner functioning of the respective inner elements. Referring specifically to FIG. 1, collecting station **10** has an incoming conduit or connection **1** and an outgoing air conduit or connection **2**. As pointed out heretofore, station **10** may be interposed in a conventional fluid or air conveying conduit at any point or collecting station at which it is desired to remove the fabrics or laundry from the system. Doors **3** and **4** are shown positioned at the lower end of collector **10** by means of hinges **5** and **6**. The hinges on door **4** are not shown. Door **4** has a suitable counterweight **7** positioned on the extending edge thereof while door **3** has a counterweight element **8** extending along the outer ending surface thereof. While counterweights **7** and **8** preferably extend along the entire lengths of the respective doors **3** and **4**, it is to be understood that equivalent spot counterweights may be used.

Referring specifically to FIG. 2, elements similar to elements on FIG. 1 are similarly numbered. The laundry and incoming air enters collector assembly **10** through conduit and incoming air enters collector assembly **10** through conduit **1** and passes into a perforated, preferably rectangular, curved conduit **20** positioned within collector assembly **10**. The flowing air passes through the perforations **26** of curved element **20** and is withdrawn through exhaust conduit **2**. It is preferred that perforated element **20** have a curvature of about 90°. A pressure seal plate **21** is positioned about conduit **20** so as to prevent any downward air flow in the annular area between conduit **20** and the interior walls of collector **10** into collecting area **27**. The lower end of conduit **20**, below seal plate **21** is solid and contains no perforations.

Positioned between seal plate **21** and lower or exterior doors **3** and **4**, which are shown closed in solid lines and open in dotted lines, are upper or inner doors **22** and **23**. These interior doors **22** and **23** are attached by suitable hinges to the lower end of conduit **20**. Door **22** contains along its extending edge a counterweight **24** while door **23** has a counterweight **25** extending along its outer edge.

In initial operation, doors **22**, **23**, **3** and **4** are all closed The material being conveyed along with the conveying air, mopes through conduit **1** to collector assembly **10** and into perforated conduit **20**. The conveying air passes through perforations **26** in conduit **20** and is withdrawn from collector assembly **10** through exhaust conduit **2**. The laundry falls free and collects on the upper surfaces of closed doors **22** and **23** exerting an opposite thrust to hat exerted by counterweights **24** and **25** thus tending to open these doors. When the weight of the laundry exceeds a predetermined amount, the thrust thus exerted will cause doors **22** and **23** to swing open.

The laundry will then fall downwardly into the temporary holding chamber **27** between doors **22** and **23** and doors **3** and **4** thus permitting upper doors **22** and **23** to immediately close. The falling laundry will then collect on closed doors **3** and **4** counteracting the thrust of counterweights **7** and **8**, causing these doors to swing open and to release the laundry from temporary area **27** to a subsequent processing machine or collecting station. Thus, the interior of collector assembly **10** is never in direct open communication with the outside environment and the respective sets of doors alternately open and close as a function of the downflowing or falling fabrics in a cyclic operation.

It is apparent that the precise measurements may be varied widely depending upon the size of the respective conduits, the weights of the respective counterweights,

and the resulting torques developed as a function of the distance of the lever arms. Normally, the counterweights on the lower doors **3** and **4** will be somewhat less than the counterweights on doors **22** and **23** in order to secure satisfactory operation for the desired predetermined fabric load. One satisfactory unit has an inlet conduit of from about four to twenty inches, as, for example, for about 16". While the preferred adaptation of the assembly is to use a perforated conduit within the housing so as to secure a positive directional flow of the material, the essence of the invention is to utilize two sets of doors operating in a cyclic manner and being actuated by a predetermined amount of material which will accumulate on the upper surfaces thereof. Under these conditions, the assembly may dispense with the perforated conduit and secure separation of the material from the conveying air by having the cross-sectional area of the housing substantially greater than the cross-sectional area of the inlet conduit. The resulting drop in velocity of the air will permit the material to fail downwardly onto the top surface of the closing means.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

**1.** A material collector assembly adapted for the efficient removal of material from a material-air conveying system which comprises in combination: (1) a housing, having (2) an inlet conduit near the top thereof for the admittance of said material and air; (3) an outlet conduit in said housing for the removal of air therefrom; (4) a perforated conduit within said housing and in communication with said inlet conduit and adapted to change the direction of flow of said material downwardly and to permit the flow of air through said perforations to said outlet conduit; (5) a seal plate positioned about said perforated conduit at the lower end thereof to prevent flow of air through the area between said perforated conduit and the inner surface of said housing; (6) a temporary material collecting area defined by the said seal plate and (7) a hinged counterweighted lower closing element positioned at the bottom of said housing, said lower closing element permitting communication from outside said housing to within said temporary material collecting area; (8) a hinged counterweighted upper closing element within said housing positioned on the lower end of said perforated conduit, said upper closing element permitting communication from within said perforated conduit to within said temporary material collecting area, said counterweights on the respective closing element being designed to keep said doors closed until a predetermined amount of material is on the upper surfaces of said doors whereby as said predetermined amount of material collects on the upper surface of said upper closing element, said material will cause said upper counterweighted closing element to open permitting the material to fall to within said temporary collecting area and onto the top surface of said lower closing element, said upper closing element then closing and said lower closing element opening due to said material on said lower closing element, one of said closing elements always being closed when the other closing element is opened.

**2.** Assembly as defined by claim **1** wherein each of said closing elements comprises a pair of matched downwardly swinging doors.

**3.** Assembly as defined by claim **1** wherein said perforated conduit is of such construction so as to change the flow of said material about 90 degrees.

**4.** Assembly as defined by claim **2** wherein said counterweights extend along the outer edges of said hinged doors.

**5.** A laundry material collector assembly adapted for the efficient removal of light weight, bulky material from a dry material-air conveying system which comprises in combination: (1) a housing, having; (2) an inlet conduit near the top thereof for the admittance of said material and air, said inlet conduit having a substantially less cross-sectional area than said housing; (3) an outlet conduit in said housing for the removal of air therefrom; (4) a perforated conduit within said housing and in communication with said inlet conduit to permit the flow of air through said perforations to said outlet conduit; (5) a temporary dry material collecting area defined by; (6) a hinged counterweighted lower closing element positioned at the bottom of said collecting area, said lower closing element permitting communication from outside said assembly to within said temporary material collecting area; and (7) a hinged counterweighted upper closing element at the bottom of said housing, said upper closing element permitting communication from within said housing to within said temporary material collecting area, said counterweights on the respective closing element being designed to keep said doors closed until a predetermined amount of laundry material is on the upper surfaces of said doors, whereby as said predetermined amount of material collects on the upper surface of said upper closing element, said material will cause said upper counterweighted closing element to open thereby permitting the material to fall within said temporary collecting area and onto the top surface of said lower closing element, said upper closing element then closing and said lower closing element opening due to said dry laundry material on said lower closing element, one of said closing elements always being closed when the other closing element is opened.



**6.** Assembly as defined by claim **5** wherein each of said closing elements comprises a pair of matched downwardly swinging doors.

**7.** Assembly as defined by claim **6** wherein said counterweights extend along the outer edges of said hinged doors.

**8.** A material collector assembly adapted for the efficient removal of material from a material-air conveying system which comprises in combination: (1) a housing, having; (2) an inlet conduit near the top thereof for the admittance of said material and air; (3) an outlet conduit in said housing for the removal of air therefrom; (4) a perforated conduit within said housing and in communication with said inlet conduit to permit the flow of air through said perforations to said outlet conduit; (5) a seal plate positioned about said perforated conduit to prevent flow of air through the area between said perforated conduit and the inner surface of said housing; (6) a material collecting area defined by the said seal plate and; (7) a lower closing element positioned at the bottom of said housing, said lower closing element permitting communication from outside said housing to within said materal collectng area; (8) an upper closing element within said housing, said upper closing element permitting communications from within said perforated conduit to within said material collecting area, said doors closed until a predetermined amount of material is on the upper surfaces of said doors whereby as said predetermined amount of material collects on said upper closing element, said material will cause said closing element to open permitting the material to fall to within said collecting area and onto said lower losing element, said upper closing element then closing and said lower closing element opening due to said material on said lower closing element, one of said closing elements always being closed when the other closing element is opened.

**9.** Assembly as defined by claim **8** wherein each closing element comprises a set of outwardly opening doors and having counterweights to normally keep the doors in closed position.

**10.** A material collector assembly adapted for the efficient removal of material from a material-air conveying system which comprises in combination: (1) a housing, having (2) an inlet conduit for the admittance of said material and air; (3) an outlet conduit in said housing for the removal of air therefrom; (4) a perforated conduit within said housing and in communication with

said inlet conduit and adapted to permit the flow of air through said perforations to said outlet conduit; (5) a seal plate to prevent flow of air from the area between said perforated conduit and the inner surface of said housing; (6) a temporary material collecting area defined by the said seal plate and (7) a lower closing element positioned at the bottom of said housing, said lower closing element permitting communication from outside said housing to within said temporary material collecting area; (8) an upper closing element within said housing, said upper closing element and said seal plate located at the lower end of the perforated pipe to provide a seal between the nupper part of the housing including the interior of said perforated pipe and the temporary collecting area, said upper closing element permitting communication from within said perforated conduit to within said temporary material collecting area, said doors being designed to be closed until a predetermined amount of material is on the upper surfaces of said doors whereby as said predetermined amount of material collects on the upper surface of said upper closing element, said material will



cause said upper closing element to open permitting the material to fall to within said temporary collecting area and onto the top surface of said lower closing element, said upper closing element then closing and said lower closing element opening due to said material on said lower closing element, one of said closing elements always being substantially closed or in the act of closing when the other closing element is opened.

**11.** A laundry collector assembly as set forth in claim **10** wherein the material being collected is light weight and bulky.

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