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PILLOW CASE AND STRUCTURE FOR COUPLING THE
SAME TO FEATHER CLEANING APPARATUS
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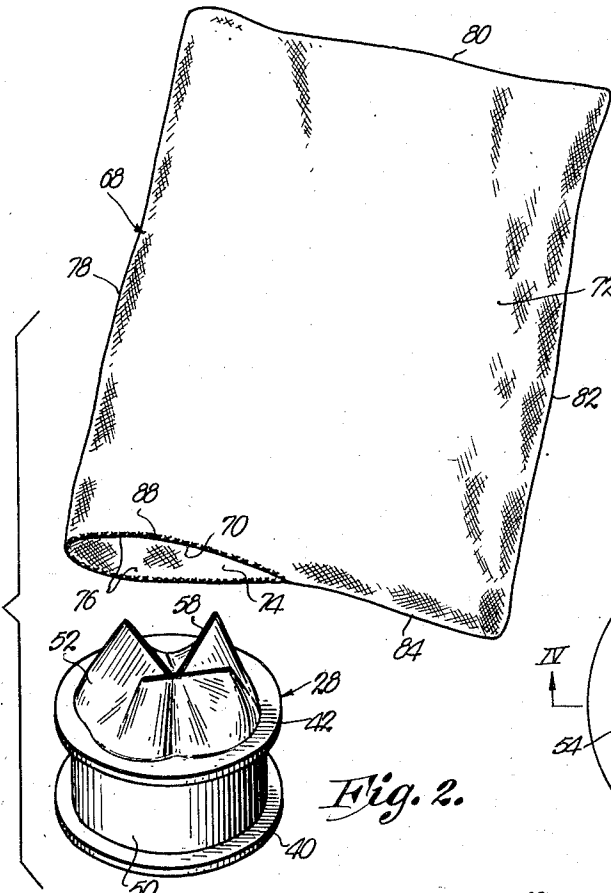
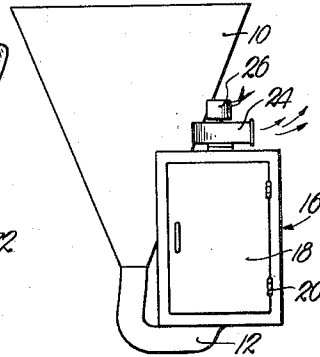


Fig. 1.

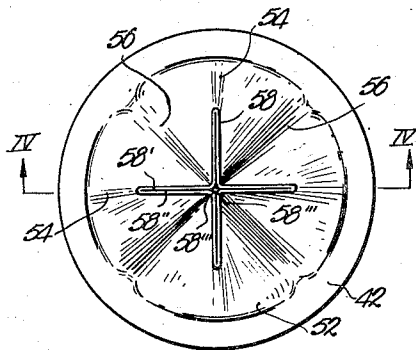


Fig. 3.

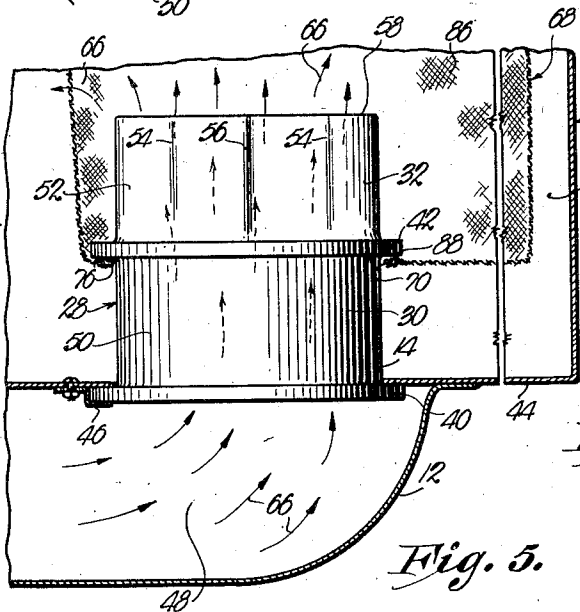
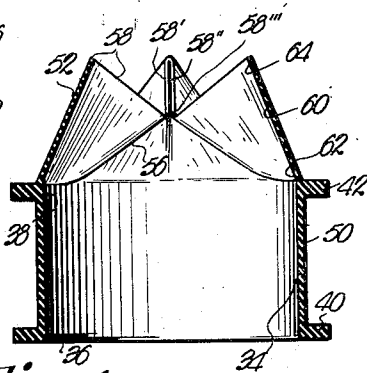


Fig. 4.

Fig. 5.

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PILLOW CASE AND STRUCTURE FOR COUPLING THE SAME TO FEATHER CLEANING APPARATUS

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3 Claims. (Cl. 141—67)

This invention relates to the field of handling feathers or the like and particularly in connection with the cleaning and handling of such materials utilized in pillow cases.

It is the principal purpose of this invention to provide improved pillow case structure together with an assembly for the delivery of feathers thereinto which includes an automatically operable check valve assembly adapted to permit the passage of feathers or the like into the pillow casing during filling of the latter, but to prevent retrogressive movement of such feathers when the air currents utilized in moving the feathers into the pillow casing are cut off.

It is another important object of this invention to provide an improved pillow case having a filling aperture therein provided with a binding therearound of organic polymerized material adapted to be thermo-sealed after the case has been filled with feathers.

It is still another important object of the invention to provide structure for releasably receiving such a pillow case to mount the same for filling with feathers or the like, which structure includes a simple and improved check valve assembly which may be inexpensively formed as a part of such structure and which is ideally adapted for positive operation in the application and surroundings for which it is intended.

Other important objects of the invention, including certain significant details of construction, will be made clear or become apparent as the following description of the invention progresses.

In the accompanying drawing:

Figure 1 is an essentially schematic elevational representation of a simplified system in which the improved apparatus of this invention finds utility.

Fig. 2 is a composite perspective view of the improved pillow casing and mounting structure therefor showing the check valve assembly of the structure in normal or closed condition.

Fig. 3 is a top plan view of the pillow case mounting structure and valve assembly showing the latter in its normal or closed condition.

Fig. 4 is a cross-sectional view taken on line IV—IV of Fig. 3; and

Fig. 5 is a fragmentary, enlarged view, partially in elevation and partially in cross-section of a portion of the filling housing showing the pillow case mounting structure and valve assembly in place therein with one of the improved pillow cases contemplated by this invention in operative disposition for filling upon the mounting structure.

It has heretofore been known to the art that feathers or the like may be satisfactorily moved by a current of air drawn through a space containing the feathers, a conduit connecting such space to a suction chamber, and a porous pillow casing within such chamber and having an aperture connected with such conduit by means of a suction fan operably disposed for maintaining the cham-

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ber partially evacuated to, in turn, create a suction through the porous walls and, therefore, within the pillow casing.

Most often, in practice, the space containing the feathers or the like will comprise a chamber in which the latter have been cleaned or otherwise processed. However, since such cleaning apparatus forms no part of this invention, it is sufficient for purposes of illustration, to provide a hopper or the like 10, having a space therewithin adapted to contain a quantity of feathers or the like.

As shown in Fig. 1, the feather-containing hopper is coupled by conduit means 12 with an opening 14 (see Fig. 5) in a filling housing generally designated 16, which is provided with an access door 18 hingedly mounted thereon as at 20 to provide an essentially air-tight suction chamber 22 within the housing 16. The vacuum or suction within the chamber 22 may be established in various fashions, the most conventional being the provision of a suction fan 24 in communication with chamber 22 and provided with a motor 26 for operating the same.

Referring now more particularly to Figs. 2, 3, 4 and 5, there is provided a combination pillow case mounting and check valve device generally designated 28. Device 28 includes a mounting structure portion 30 and a check valve portion 32. The mounting structure portion 30 is preferably comprised of a tubular, cylindrical member having a bore 34 therethrough terminating at one extremity in an inlet opening 36 and at the opposite extremity in an outlet opening 38. Member or structure 30 is also provided with a pair of spaced, out-turned, annular flanges 40 and 42, the former being disposed adjacent the inlet opening 36 and the latter being disposed adjacent the outlet opening 38.

The entire device 28 is preferably formed of resilient, deformable material such as rubber or plastic, having a normal configuration substantially as shown in Figs. 2, 3 and 4. The device 28 is mounted upon the housing 16 with the flange 40 held to the bottom wall 44 of housing 16 by any suitable means such as brackets 46, of which one is illustrated in Fig. 5. When so mounted, the intermediate portion of member 30 extends through opening 14 of housing 16, into the suction chamber 22, the inlet opening 36 of device 28 being in communication with the feather conduit 12 having a space 48 therewithin normally containing feathers or the like (not shown). The outlet opening 38 and flange 42 are obviously also disposed within chamber 22 in spaced relation to the bottom wall 44, presenting an intermediate cylindrical section 50 on the member 30 between the flanges 40 and 42.

The valve portion 32 of device 28, which is also of resilient material, is illustrated in Fig. 5 in its fully distorted condition in which its configuration is seen to be substantially cylindrical and tubular. Portion 32 preferably comprises an element 52 having alternately spaced about its circumference, inward lines of fold 54 and outward lines of fold 56. The preferred number of lines of fold 54 and 56 is four of each with same equally spaced about the circumference of element 52 and disposed in parallelism to the axis of the latter when same is in its fully distorted condition.

The normal configuration of the element 52 by virtue of its formation and resilient nature is, however, as illustrated in Figs. 2, 3 and 4. In this normal condition, the element 52 is folded upon the lines of fold 54 and 56 to dispose those parts 58' and 58'' of the uppermost edge 58 of the element 52 adjacent a given inward line of fold 54 in side-by-side, substantially touching relationship and to dispose those parts 58''' at the end of the outward lines of fold 56 in close proximity to one another.

It will be apparent, therefore, that the element 52 is

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adapted to act as a check valve since the passage 60 therethrough has its inlet extremity 62 in communication with the outlet end 38 of member 50 and its outlet extremity 64 normally closed by the disposition of the various parts of edge 58 when the element 52 is in its normal configuration.

The element 52 is sufficiently flexible however, to permit distortion of same to the substantially cylindrical configuration illustrated in Fig. 5, wherein the lines of fold 54 and 56 are substantially unfolded, under the influence of an air current designated by the arrows 66, moving in a direction to pass through member 50 and out the outlet extremity 64 of the valve element 52. Obviously, when there are feathers or the like (not shown) within the space 48, the same will be carried with the air current 66 through the member 50 and element 52 and discharged through the outlet extremity 64 of valve element 52.

Should the force of air currents 66 decrease sufficiently, or its direction reverse, the element 52 will return to its normal, valve-closing configuration, to prevent retrogressive movement of the feathers (not shown) back through the member 50 and into the space 48, although the valve action of element 52 is sufficiently loose to permit passage of air therethrough for equalizing pressure differentials without damage to the element 52.

Disposed upon the device 28 is a pillow casing generally designated 68, having a filling aperture 70 in one extremity thereof. The casing 68 is preferably formed of porous fabric material and has a pair of rectangular side portions 72 and 74 which are marginally interconnected about their entire peripheries except for that partial portion 76 of one end of each of side portions 72 and 74 which are initially left unconnected to present the filling aperture 70. Side portions 72 and 74 may be integral and folded as at 78 and stitched together along the remaining edges 80 and 82 and the remaining portion of edges 84.

The aperture 70 is formed with predetermined dimensions adapted for fitting tightly about the portion of member 50 between flanges 40 and 42, as illustrated in Fig. 5, but of such dimension as not to pass over the flange 42 when the latter is in its normal, undistorted configuration.

To install the casing 68 upon the mounting structure 30, the member 50 is manually distorted to permit the passage of flange 42 through aperture 70 and then released so that the edge portions 76 of casing 68 fit tightly upon the portion of member 50 below the flange 42 and are held against displacement therefrom by the flange 42.

Referring particularly to Fig. 5, it will be observed that the casing 68 is provided with an internal feather-receiving chamber 86 which is closed except for the porosity of the casing 68 and the connection with passage 60 and bore 34 effected by the aperture 70. In order to give the aperture defining edge portions 76 of casing 68 the required strength, as well as to provide for the convenient closing and sealing of the aperture 70 after the chamber 86 has been filled with feathers or the like and the casing 68 removed from the device 28, the margins of side portions 72 and 74 adjacent edge portions 76 are preferably provided with a binding 88 comprised of a strip of organic polymerized thermo-sealable material, for instance, polyethylene, stitched to the side portions 72 and 74 as at 90.

In operation, the casing 68 is emplaced upon device 28 by distortion of the latter and insertion of the element 52 and flange 42 through aperture 70 as previously described. Element 52 will presumably be in its normal or closed configuration. The access door 18 of housing 16 will then be closed and the suction fan 24 placed in operation by energization of its motor 26.

Operation of fan 24 creates a partial vacuum or suction within the filling chamber 22 of housing 16 which results in currents of air 66 being drawn from the feather-

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receiving chamber 36 of casing 68 by virtue of the porosity of the fabric of which casing 68 is formed. Such suction or partial vacuum is in turn imparted to the valve element 52 which distorts to an open condition such as illustrated in Fig. 5 to permit the passage through member 50 and element 52 of the air currents 66 coming from the space 48 within the feather-containing conduit 12.

The feathers (not shown) will obviously be carried by the current 66 from the space 48 into the chamber 86 of casing 68, and this filling operation is continued until a predetermined amount of feathers or the like (not shown) have been withdrawn from space 48 and transferred into chamber 86. The motor 26 may then be deenergized to cut off fan 24, whereupon the suction in chamber 22 of housing 16 will be terminated and the valve element 52 will return to its normal closed configuration preventing retrogression of feathers (not shown) from the chamber 86 of casing 68, through passage 60 and bore 34 to space 48 of conduit or the like 12.

It may be noted that the action of valve element 52 is particularly advantageous in certain types of commercial apparatus adapted for the cleaning and filling operations being performed in one machine, since, in such apparatus, the cleaning operation often tends to create a greater suction or vacuum in the space 48 than exists within the chamber 86 of casing 68 for short intervals of time. Manifestly, the provision of the valve assembly 32 prevents the retrogressive movement of feathers which would otherwise occur during such intervals in such apparatus.

After removal of a filled casing 68 from the housing 16, the aperture 70 may be conveniently sealed by closing the same to press the binding 88 upon each of the side portions 72 and 74 against the binding 88 on the other, and then applying heat in any suitable manner, several of which are well known to the art and form no part of this invention.

It will be apparent to those skilled in the art that certain minor modifications and changes could be made from the exact details of construction disclosed for purposes of illustration. Accordingly, it is to be understood that this invention shall be deemed limited within its true spirit and intention only by the fair scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In apparatus for removing feathers or the like in a predetermined, packaged quantity from a space containing said feathers in bulk, said apparatus comprising a housing provided with a chamber therein and having an inlet opening, an outlet opening and an access opening, the latter being provided with a shiftable closure; means coupling said inlet opening with said space to place said inlet opening in communication with said feathers; a tubular, normally cylindrical, resilient member provided with a bore having an inlet end and an outlet end, said member being mounted upon the housing with said inlet end in communication with said inlet opening and said outlet end within said chamber and adapted for communication with the latter; a check valve assembly on the member disposed for normally substantially closing said outlet end of the bore and for opening said outlet end responsive to a flow of air from said space to said chamber; a porous, fabric, feather-receiving casing having an aperture therein, said casing being positioned within said housing and the walls of said aperture embracing said resilient member; means for releasably holding the casing upon the member; and means coupled with said outlet opening of the housing for creating a suction in said chamber.

2. An automatic check valve assembly for feathers or the like adapted to be carried by a current of air from a first space containing a supply of said feathers to a second and separate space to which said feathers are to be transferred, said valve check assembly compris-

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ing a tubular, cylindrical, base member provided with a bore having an inlet end and an outlet end, said member being adapted for disposition for placing said inlet end in communication with said first space and said outlet end in communicable relationship with said second space; and a valve extension element on the member and coaxially aligned therewith, said element having alternate inward and outward lines of fold extending parallel to its axis and being provided with a passage having an inlet extremity in communication with said outlet end of the bore and an outlet extremity adapted when open for communication with said second space, said element being resilient and having a normal configuration wherein the element is folded along said lines of fold substantially closing said outlet extremity thereof, whereby to prevent retrogressive movement of said feathers from said second space to said first space when the air pressure in said second space is at least as great as that in said first space, said element being distortable under the influence of an excess of air pressure in said first space over that in said second space to a substantially cylindrical, tubular condition opening said

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outlet extremity of the passage, whereby to place said first space in communication with said second space to permit the flow of a current of air carrying said feathers from said first space to said second space.

3. In the valve assembly as set forth in claim 2, wherein the extremities of said outward lines of fold at said outlet extremity of the element are disposed in close proximity to each other and the portions of the element adjacent each inward line of fold have the edges thereof at said outlet extremity of the element disposed in side-by-side, substantially interengaging proximity to each other when said element is in said normal configuration.

References Cited in the file of this patent

UNITED STATES PATENTS

584,091	Leidich	June 8, 1897
1,876,591	Bawden	Sept. 13, 1932
2,029,608	Buchman	Feb. 4, 1936
2,138,605	Landis	Nov. 29, 1938
2,437,196	Huttner et al.	Mar. 2, 1948
2,596,135	Dowling et al.	May 13, 1952