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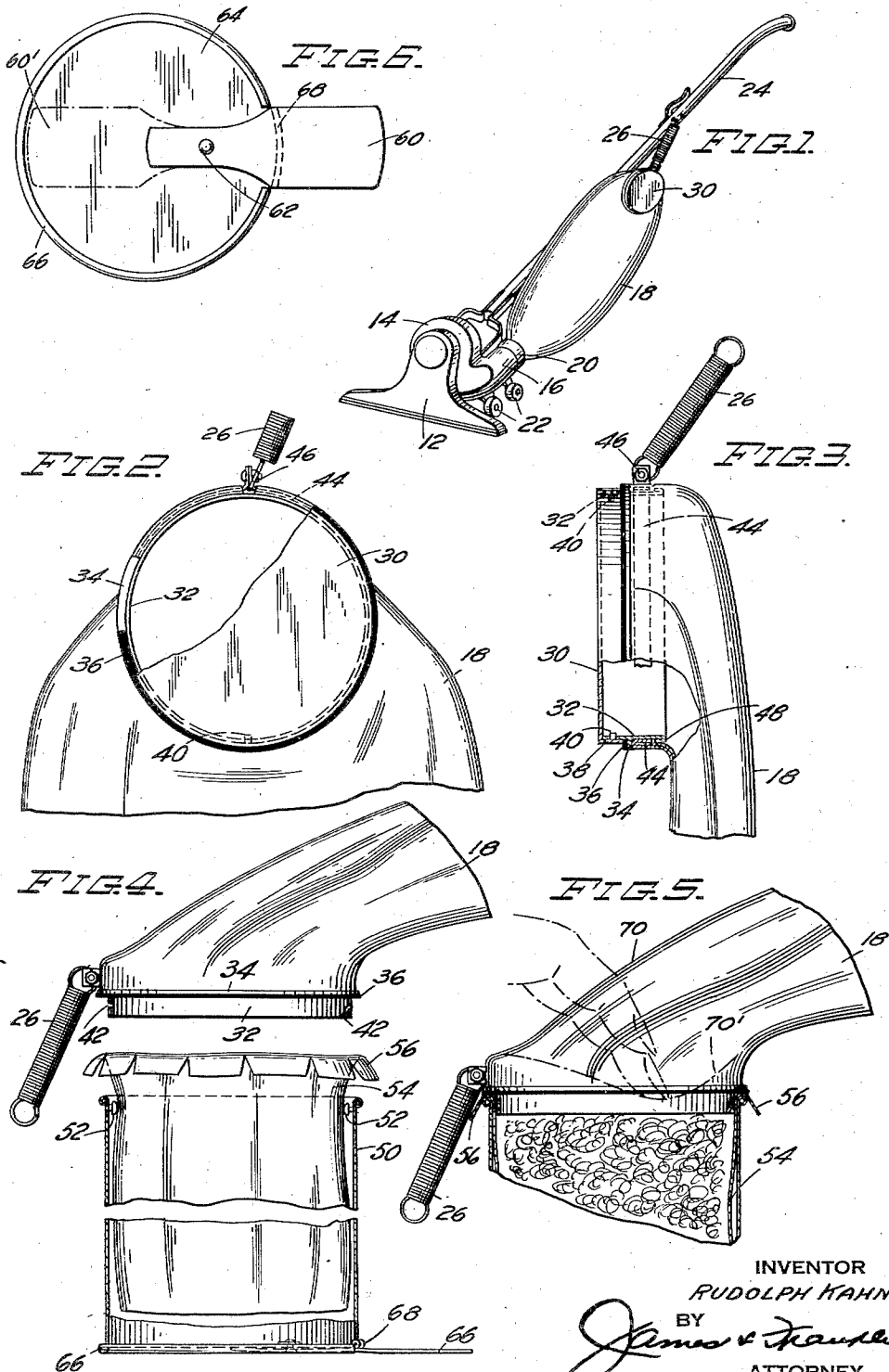
R. KAHN

2,222,077

SUCTION CLEANER

Filed May 28, 1938

2 Sheets-Sheet 1



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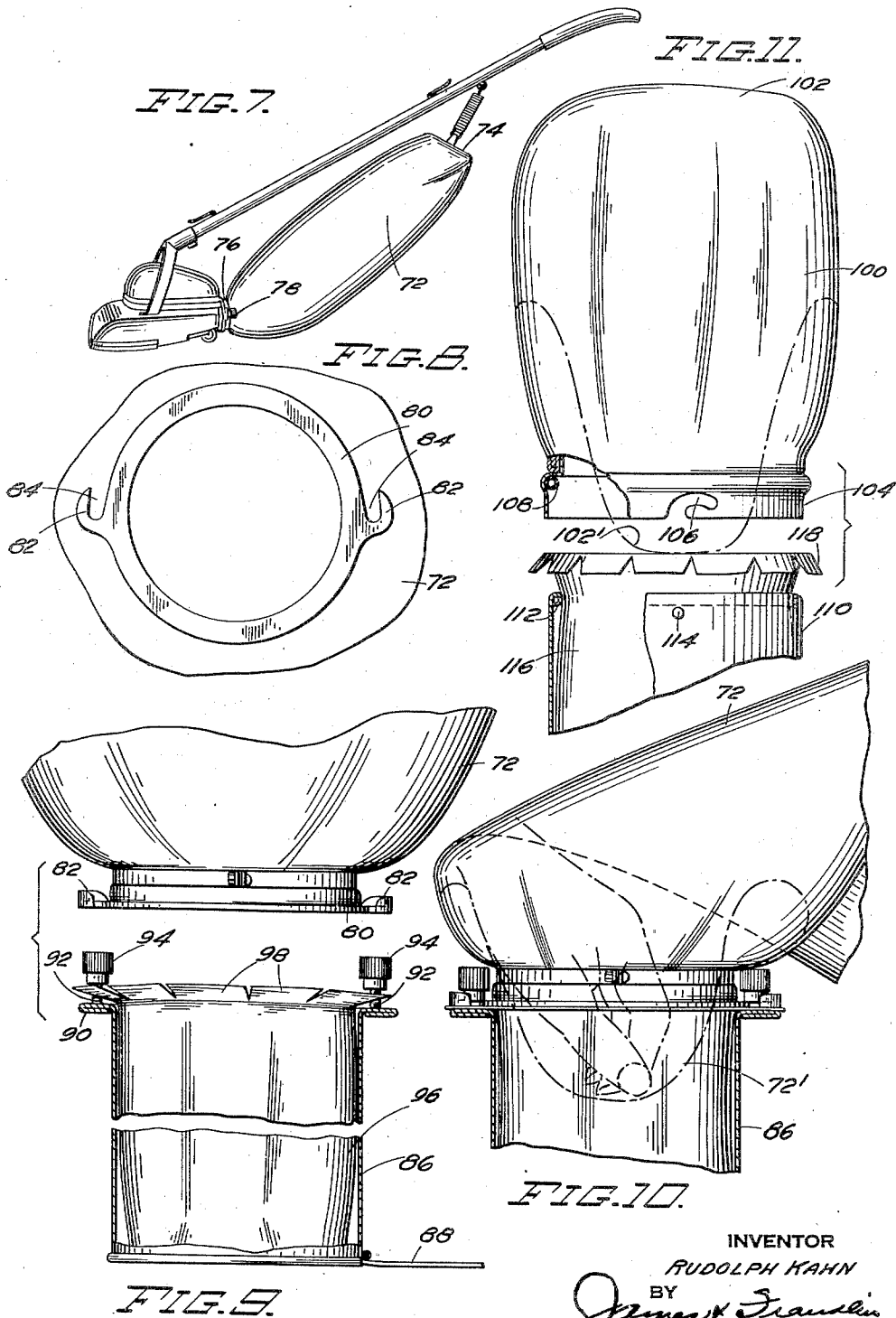
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## UNITED STATES PATENT OFFICE

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## SUCTION CLEANER

Rudolph Kahn, New York, N. Y.

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6 Claims. (Cl. 183—52)

This invention relates to suction cleaners and more particularly to an improved dust bag therefor and associated apparatus to facilitate emptying of the dust bag.

The primary object of my invention is to generally improve suction cleaners.

A more particular object is to facilitate emptying of the dust bag of a suction cleaner. At the present time, this is a dirty, disagreeable, and messy task, for a substantial amount of dust flies around during the emptying operation. It is not feasible to empty the dust bag in an apartment, and it is necessary to do this in a back yard, roof, or cellar. The longer fibres and threads in the dust bag gather together and form large clots of nap which "ball up" within the dust bag and refuse to shake out of the bag. It is necessary for the operator to insert his hand into the end of the dust bag in order to pull out these large balls of nap. The difficulty is a self-aggravating one because the ordinary householder procrastinates and delays emptying the bag as long as possible, and this greatly reduces the efficiency of the machine, places an unnecessary load on the fan motor, and further increases the difficulty and discomfiture attendant upon emptying the bag.

It has already been proposed to use an inexpensive discardable paper sack or the like into which the dust is to be transformed from the dust bag, with a closed connection, but such a bag cannot be handled readily and is very apt to break, resulting in the discharge of dirt on the floor and conditions worse than would obtain with the emptying of a conventional bag. An object of the present invention is to overcome this difficulty, and in accordance with my invention, I provide a rigid receptacle large enough to receive and protectively house the paper sack. The dust bag is provided with a discharge ring of relatively large diameter, and arranged to fit the large full diameter top of the receptacle. The paper sack is placed in the receptacle and its edge is turned outwardly over the mouth of the receptacle. The ring of the dust bag is secured in place with a dust-proof fit and the dirt is then transferred to the paper sack. The receptacle not only protects the paper sack against breakage, but supports the same in position while the dust bag is being shaken.

In accordance with a further and more detailed feature and object of my invention, the receptacle is provided with a foot plate which is movably mounted at the bottom of the receptacle and may be moved to an outwardly projecting position, resting on the floor so that one foot may

be placed on the foot plate to help better hold the receptacle against movement while the dust bag is being emptied.

Difficulty may arise in transferring the contents of the dust bag due to the formation of large clots of nap, as previously mentioned. This difficulty might be minimized to some extent by the use of a ring and receptacle of exceedingly large diameter, but this introduces a disadvantage in necessitating a large ring and equally large closure on the dust bag, and a large receptacle taking up considerable room when not in use. Moreover, I believe it desirable to encourage frequent emptying of the dust bag not only by increasing the convenience of the emptying operation, as herein described, but also, by using a paper sack and rigid receptacle of only moderate dimension such that it will be overloaded if emptying of the dust bag is neglected for too long a period. Frequent emptying of the dust bag makes for far more efficient operation of the cleaner.

A further object of my invention, therefore, is to facilitate emptying of large clots of nap from the dust bag while using a discharge ring of only moderate diameter. The arrangement is such that when a large clot of nap is shaken to a point near the discharge ring, it is readily pushed through the discharge ring into the receptacle by simply depressing the side of the dust bag opposite the ring, this side being disposed directly over the ring during the transfer operation. The discharge ring may be disposed on the side of the dust bag, as it then assumes a more compact and neat portion when the dust bag is suspended from the stick or handle of the vacuum cleaner in the conventional manner.

While I have described the use of a paper sack within the rigid receptacle, it will be understood that even without the paper sack the invention is of advantage in that the dirt may be transferred from the dust bag into the receptacle without producing clouds of dust, and the contents of the receptacle may subsequently be emptied with very little free dust because the receptacle is smooth walled, and empties without that shaking which is necessary when emptying the fabric dust bag.

It is not essential to provide a special discharge ring on the fabric bag of the suction cleaner. In some cleaners, the bag is closed at the upper end and is provided with a large entrant ring at the lower end, and this entrant ring is also used as a discharge ring. My improvement, with its "push emptying" of nap, may be readily applied to such a cleaner by simply providing a rigid pro-

protective receptacle for the paper sack with a top end which mates with the ring of the dust bag. In this way, I have applied my invention not only to large size suction cleaners for carpets, but also to miniature hand-carried cleaners having a single ring for both intake and discharge of dirt.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, my invention consists in the suction cleaner dust bag and associated elements and their relation one to the other, as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by drawings, in which:

Fig. 1 is a perspective view showing the invention applied to an otherwise conventional suction cleaner;

Fig. 2 is a partially sectioned view of the upper end of the dust bag at the discharge ring;

Fig. 3 is a side elevation of the same;

Fig. 4 is a partially sectioned elevation illustrating the method of applying the dust bag to a paper sack and protective receptacle;

Fig. 5 is explanatory of the transfer of large clots of nap from the dust bag into the receptacle;

Fig. 6 is a bottom view of the receptacle;

Fig. 7 illustrates a modified form of suction cleaner to which my invention may be applied;

Fig. 8 shows the dust bag ring of the cleaner of Fig. 7;

Fig. 9 is a partially sectioned side elevation showing the manner in which the dust bag is applied to the paper bag and protective receptacle;

Fig. 10 illustrates "push emptying" of the dust bag; and

Fig. 11 is explanatory of the application of my invention to the dust bag of a small hand-carried cleaner.

Referring to the drawings, and more particularly to Fig. 1, the suction cleaner is conventional in comprising a suction nozzle 12 leading to a motor driven fan 14 the outlet of which is shown at 16 and is connected to a porous fabric dust bag 18 by means of a coupling ring 20 which may be of conventional character. The cleaner is moved on wheels 22 by means of a stick or handle 24, and the upper end of the dust bag is connected to the handle 24 by means of a spring 26. The outstanding difference between the cleaner of Fig. 1 and conventional cleaners centers about the discharge opening which consists of a relatively large or at least moderately large diameter ring disposed on one side of the dust bag near the upper end thereof and closed in dust-proof manner by means of a cap 30.

Referring now to Figs. 2 and 3, the discharge ring 32 is flanged at 34 and thereby forms a seat for a rubber or other suitable gasket 36. The cap 30 has a flange or side wall 38 (Fig. 3) provided with inwardly projecting pins 40. Ring 32 has bayonet slots 42 (see Fig. 4), and these slots receive the pins 40 when the cap is tightened onto ring 32. The disposition of the pins, slots, flange 34 and gasket 36 is such as to provide a dust-tight closure.

The dust bag 18 is permanently secured to ring 32 in any convenient manner. In the present case, the fabric of the dust bag is turned inwardly about a metal band 44 the ends of which are turned outwardly and are adapted to be pulled together by means of a screw-and-nut connection 46. The lower end of support spring 26 is secured to the discharge ring at the same

time, for the screw connection 46 passes through the lower eye of the spring. A tight clamping pressure may be effected by band 44, thus making a dependable, dust-proof connection between the dust bag and the discharge ring. The inner edge of the discharge ring 32 may, if desired, be provided with a bead or ledge 48, thus anchoring the parts securely together.

It will be observed that the dust bag 18 is so tailored that the discharge ring 32 is disposed on one side of the dust bag rather than across the end of the same. This will be clearly evident from consideration of Figs. 1, 2, and 3. The arrangement is convenient in permitting the discharge ring and the cap 30 to lie in a relatively upright and compact position. It is also of value for a reason explained later and having to do with the discharge of clots of nap from the bag.

Referring now to Fig. 4, I provide a rigid receptacle 50 which is widely open at its upper end. The receptacle as here illustrated is made of sheet metal and may follow ordinary can-making practice. The diameter of the receptacle is such as to accurately fit the ring 32, and the receptacle is provided with inwardly projecting pins 52 which mate with the bayonet slots 42 on ring 32. The parts fit together with a dust-proof fit, and the regular gasket 36 of the discharge ring functions with the receptacle 50 as well as with the cap 30.

A paper sack 54 of suitable dimension is slid into the receptacle 50 and is protected and supported thereby during the dirt transferring operation. An ordinary paper sack may be used in which case the upper end may be torn at a few points to facilitate folding the edge outwardly around the mouth of the can. If preferred special paper sacks may be made which accurately fit the can and which are provided during their manufacture with a slit mouth facilitating turning of the sack outwardly as indicated in Fig. 4. In Fig. 4, the sack 54 is in the act of being placed in the can and has not yet been pushed all the way down. When all the way in, the downturned edge 56 assumes the position shown in Fig. 5, and pins 52 are exposed within the sack by simply pressing the walls of the sack outwardly at the pins. After the sack has been inserted in the can, the discharge ring 32 is secured in place, as previously described, and the contents of the dust bag are then shaken from the dust bag into the paper sack.

During this transfer operation, the paper sack is held against movement and is protected against breakage by the can. This convenient fixed support of the bag may be improved by providing the receptacle 50 with a special foot plate, and referring to Figs. 4 and 6, I provide a foot plate 60 which projects from one side of the receptacle and on which a foot may be placed while transferring the dirt. Foot plate 60 is preferably made movable, and in the present case is pivoted so that it may be turned out of the way when not in use. For this purpose, the plate is pivoted at 62 on the bottom 64 of the can. The dimension of the plate is such that it may be turned from the solid line position 60 to the broken line position 60', at which time it lies beneath the can and within the bottom bead 66. This bottom bead is preferably struck upwardly and outwardly, as is indicated at 68, thereby forming a recess into which plate 60 fits, thus retaining the plate in projecting position during use. This arrangement has the further advantage of bringing the bottom of the

plate flush with bead 66 of the can so that the assembly will rest flat on the floor in a secure manner.

A light shaking of the small end of the dust bag begins to transfer loose dust into the paper sack, but in ordinary practice, this transfer is soon interrupted by large clots of nap which move in the dust bag to the discharge ring but which will not of themselves pass through the discharge ring. This difficulty is easily overcome in the present case by simply occasionally pressing the side wall 70 of the bag inwardly with the fingers of one hand, as is indicated by the change from the solid line position 70 to the broken line position 70' in Fig. 5. This pushes the bunches of nap through the discharge ring and into the paper sack. The transfer operation may thus be proceeded with under convenient, clean and dust-free conditions. After the contents of the dust bag have been transferred into the paper sack, the dust bag is freed from the receptacle, the cap 30 is replaced, and the dust bag is again hung on the handle of the cleaner. The paper sack with its contents is removed from the can and deposited in a garbage can, ashcan, or dropped in an incinerator passage, depending upon the most convenient means of disposal which happens to be available.

It may be mentioned that many of the advantages of the invention may be obtained even without using the paper sack. Specifically, the dirt may be transferred from the dust bag into the can in a clean and dust-free manner, following which the can may be emptied. While some dust will fly during emptying of the can, it is very slight in amount compared to the clouds of dust which are raised when violently shaking the dust bag with its end open. Moreover, there is no need to insert one's hand directly into the dust bag in order to pull out the clumps or bunches of nap.

Referring now to Fig. 7, I there illustrate a different form of suction cleaner in which the dust bag 72 is permanently closed at its upper end 74 and is attached to the fan outlet at 76 with the aid of a moderately large size attaching ring. The ring is secured in place by two knurled nuts one of which is indicated at 78.

The nature of the attaching ring 80 is clearly shown in Fig. 8, the ring having a pair of ears 82 defining open-ended slots 84 which receive the attaching screws. In this particular make of suction cleaner, the ring is attached by a face-to-face connection.

Referring now to Fig. 9, the protective receptacle 86 is much like that previously described and is preferably similarly provided with an outwardly swingable foot plate 88. The upper end of the container differs in being turned outwardly and reversely bent to form a stiff broad-surfaced flange 90 adapted to receive the attaching ring 80 of dust bag 72. For this purpose, the flange 90 is provided with fixedly mounted upwardly projecting screws 92 each of which carries a suitable knurled nut 94. The paper sack 96 is placed in receptacle 86 and its upper edge is turned outwardly as is indicated at 98. Ring 80 is applied on top of the outwardly turned mouth of the paper bag and is secured tightly in place against the paper and the flange 90 of the receptacle by means of the screws 94.

The condition of the parts is then as shown in Fig. 10. The dirt is transferred partially by shaking and partially by "push emptying," the latter being, in my opinion, a most valuable

feature of the invention. The reason for this is that mere shaking of the bag will transfer dirt only until a large clot or bunch of nap reaches the discharge ring, whereupon no further amount of shaking will succeed in transferring the nap through the ring. However, a gentle push or the fabric of the bag will readily transfer even a large stubborn clump of nap through the discharge ring, and this is indicated by the broken line position 72' in Fig. 10. Some suggestion has been made by the manufacturers of vacuum cleaners concerning the possibility of placing the discharge ring on a newspaper spread out on the floor and thereupon shaking the dirt out of the dust bag and onto the newspaper. The main difficulty with this suggested procedure is that bunches of nap will not pass through the discharge ring. With such an arrangement, the bunches of nap cannot be pushed through the ring for the ring rests on the floor. Considered in this aspect, one of the important features of the present invention resides in the fact that the rigid receptacle provides an elevated support for the discharge ring, thereby making it possible to push the nap through and to a point below the discharge ring. Incidentally, this "push emptying" compacts the dirt in the paper sack and receptacle, and thereby increases the effective capacity of the sack and receptacle. For this reason, a larger charge of dirt may be unloaded from the dust bag than might be anticipated from inspection of the receptacle relative to the size of the dust bag.

In Fig. 11, I show the application of my invention to the dust bag 100 of a small portable or a hand-carried cleaner. In this particular cleaner, the dust bag is short relative to its diameter, as will be seen in the drawings, and it is closed at its upper end 102. Its lower end is secured to a relatively large diameter ring 104. This ring is provided with bayonet slots 106 and a soft rubber gasket 108. The bag is secured to the discharge outlet of the fan by simply engaging slots 106 with mating pins on the fan outlet.

For use with this cleaner, the receptacle 110 may be made much as was described in Figs. 4 and 5, except that the upper edge of the receptacle is turned inwardly, as is indicated at 112, while the attaching pins 114 project outwardly from the can. The paper sack 116 is of the character previously described, and its outwardly turned mouth or lip 118 is bent downwardly about the mouth of receptacle 110. To secure the parts together, it is merely necessary to push the paper sack 116 into rigid receptacle 110 and to thereupon secure the ring 104 to the receptacle and paper sack with the aid of slots 106 and pins 114. The gasket 108 functions with receptacle 110 just as it does with the cleaner. The dust bag is emptied by shaking, and clots of nap are simply pushed through the discharge ring by pressing the top end 102 of the bag from the solid line position to the broken line position 102'.

It is believed that the construction and method of use of my invention, as well as the many advantages thereof, will be apparent from the foregoing detailed description. It will also be apparent that while I have shown and described my invention in a preferred form, many changes and modifications may be made in the structures disclosed without departing from the spirit of the invention defined in the following claims. In the claims, I refer to the discharge ring as "relatively large in diameter," but this means relative to the

conventional inlet coupling at the lower end, in bags which are open at the upper end.

I claim:

1. The combination with a suction cleaner dust bag having a relatively large-diameter rigid discharge ring permanently secured thereto, said ring being so shaped and dimensioned as to readily detachably receive a removable closure for closing said ring with a dust-tight fit, of an inexpensive discardable paper sack for receiving the dust and nap from the dust bag, and a rigid receptacle large enough to receive and protectively enclose the paper sack, said receptacle having an open top which is so dimensioned and arranged as to receive the mouth of the paper sack and the discharge ring of the dust bag with the sack clamped between the top and the ring with a dust-proof fit in order to facilitate emptying of the dust bag into the paper sack.

2. The combination with a suction cleaner dust bag having a ring opening secured thereto, of an inexpensive discardable paper sack for receiving the dust and nap from the dust bag, and a rigid receptacle large enough to receive and protectively enclose the paper sack, said receptacle having a closed bottom and an open top, the top being so dimensioned and arranged as to receive the mouth of the paper sack and the discharge ring of the dust bag with the sack clamped between the top and the ring with a dust-proof fit in order to facilitate emptying of the dust bag into the paper sack.

3. The combination with a suction cleaner having a dust bag provided with a ring opening, of an inexpensive discardable paper sack for receiving the dust and nap from the dust bag, and a rigid receptacle large enough to receive and protectively enclose the paper sack, said receptacle being a cylindrical receptacle of uniform diameter and having a closed bottom and a fully open top dimensioned to receive the ring of the dust bag, and said ring and receptacle being provided with appropriate mating means for securing the ring to the mouth of the receptacle with the mouth of the paper sack clamped therebetween, said receptacle facilitating emptying of the dust bag into the paper sack.

4. The combination with a suction cleaner dust bag having a relatively large-diameter rigid discharge ring permanently secured thereto, said ring being so shaped and dimensioned as to readily detachably receive a removable closure for closing said ring with a dust-tight fit, of an inexpensive discardable paper sack for receiving the dust and nap from the dust bag, and a rigid receptacle large enough to receive and protectively

enclose the paper sack, said receptacle having an open top which is so dimensioned and arranged as to receive the mouth of the paper sack and the discharge ring of the dust bag with the sack clamped between the top and the ring with a dust-proof fit in order to facilitate emptying of the dust bag into the paper sack, said receptacle being provided with a foot plate movably mounted on the bottom thereof for movement between a retracted position beneath the bottom and an exposed position outside the bottom, said foot plate when in exposed position helping to hold the receptacle stationary during transfer of dirt from the dust bag.

5. The combination with a suction cleaner dust bag having a ring opening secured thereto, of an inexpensive discardable paper sack for receiving the dust and nap from the dust bag, and a rigid receptacle large enough to receive and protectively enclose the paper sack, said receptacle having a closed bottom and an open top, the top being so dimensioned and arranged as to receive the mouth of the paper sack and the discharge ring of the dust bag with the sack clamped between the top and the ring with a dust-proof fit in order to facilitate emptying of the dust bag into the paper sack, and a foot plate pivotally mounted on the bottom of the receptacle in such a manner that it may be turned beneath the receptacle when not in use and may be turned outwardly to rest on the floor outside the receptacle in order to facilitate holding the receptacle against movement during emptying of the dust bag.

6. The combination with a suction cleaner having a dust bag provided with a ring opening, of an inexpensive discardable paper sack for receiving the dust and nap from the dust bag, and a rigid receptacle large enough to receive and protectively enclose the paper sack, said receptacle being a cylindrical receptacle of uniform diameter and having a closed bottom and a fully open top dimensioned to receive the ring of the dust bag, and said ring and receptacle being provided with appropriate mating means for securing the ring to the mouth of the receptacle with the mouth of the paper sack clamped therebetween, said receptacle facilitating emptying of the dust bag into the paper sack, said receptacle being provided with a foot plate movably mounted on the bottom thereof for movement between a retracted position beneath the bottom and an exposed position outside the bottom, said foot plate when in exposed position helping to hold the receptacle stationary during transfer of dirt from the dust bag into the receptacle.

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