June 7, 1955 G. A. BRACE 2,710,072

SUCTION CLEANERS

Filed Jan. 26, 1953 4 Sheets-Sheet 1

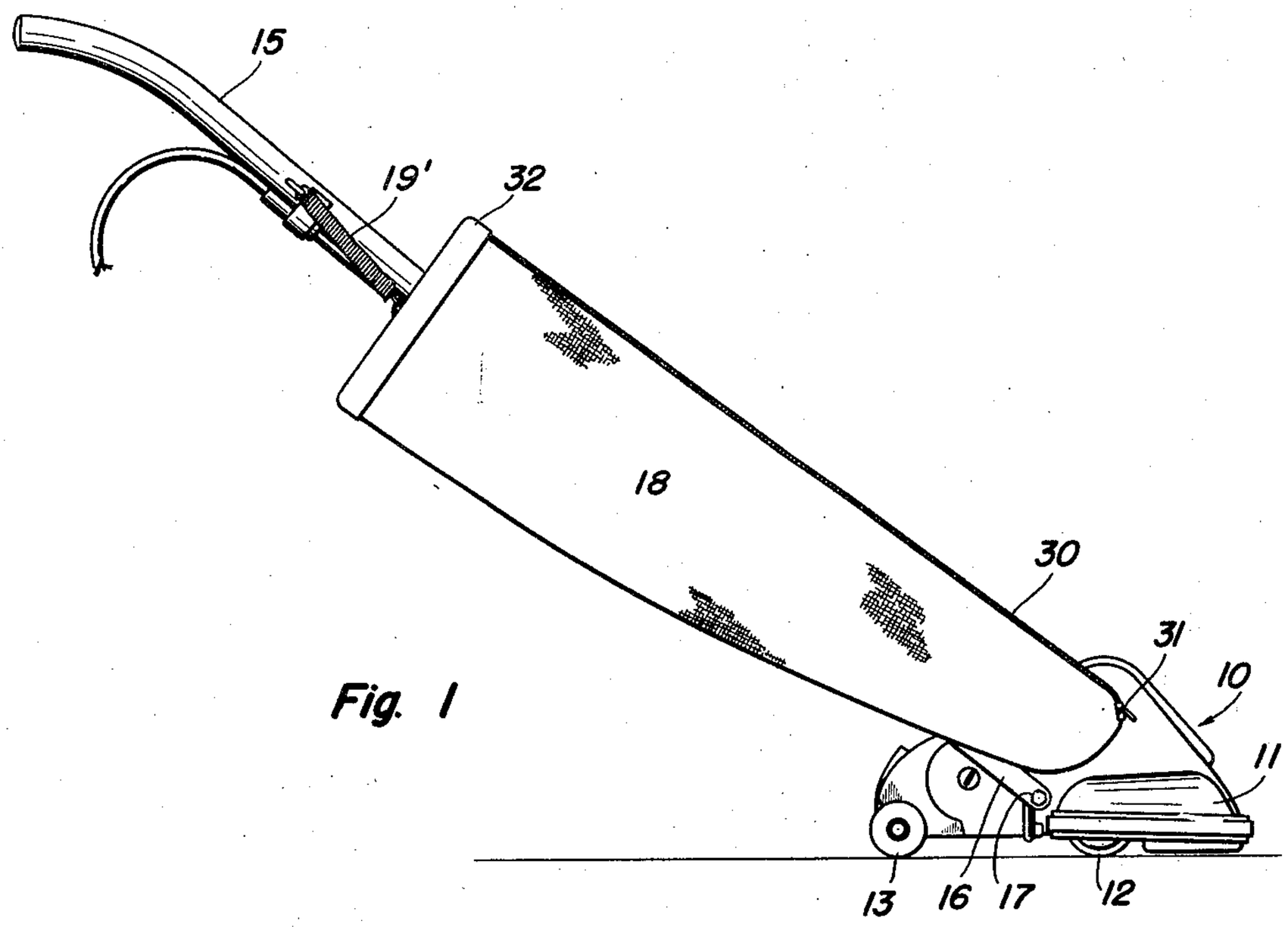

Fig. 1

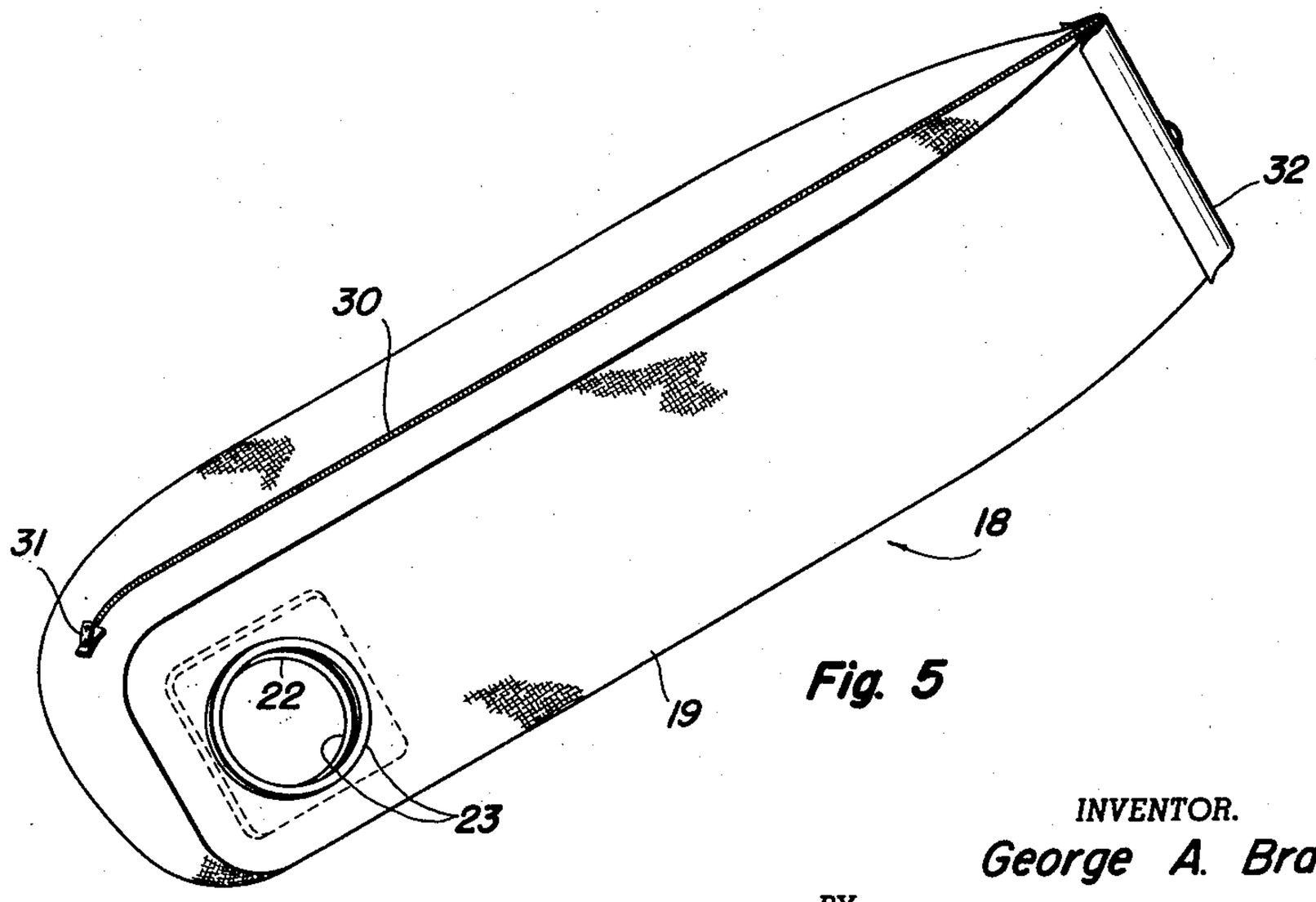

Fig. 5

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SUCTION CLEANERS

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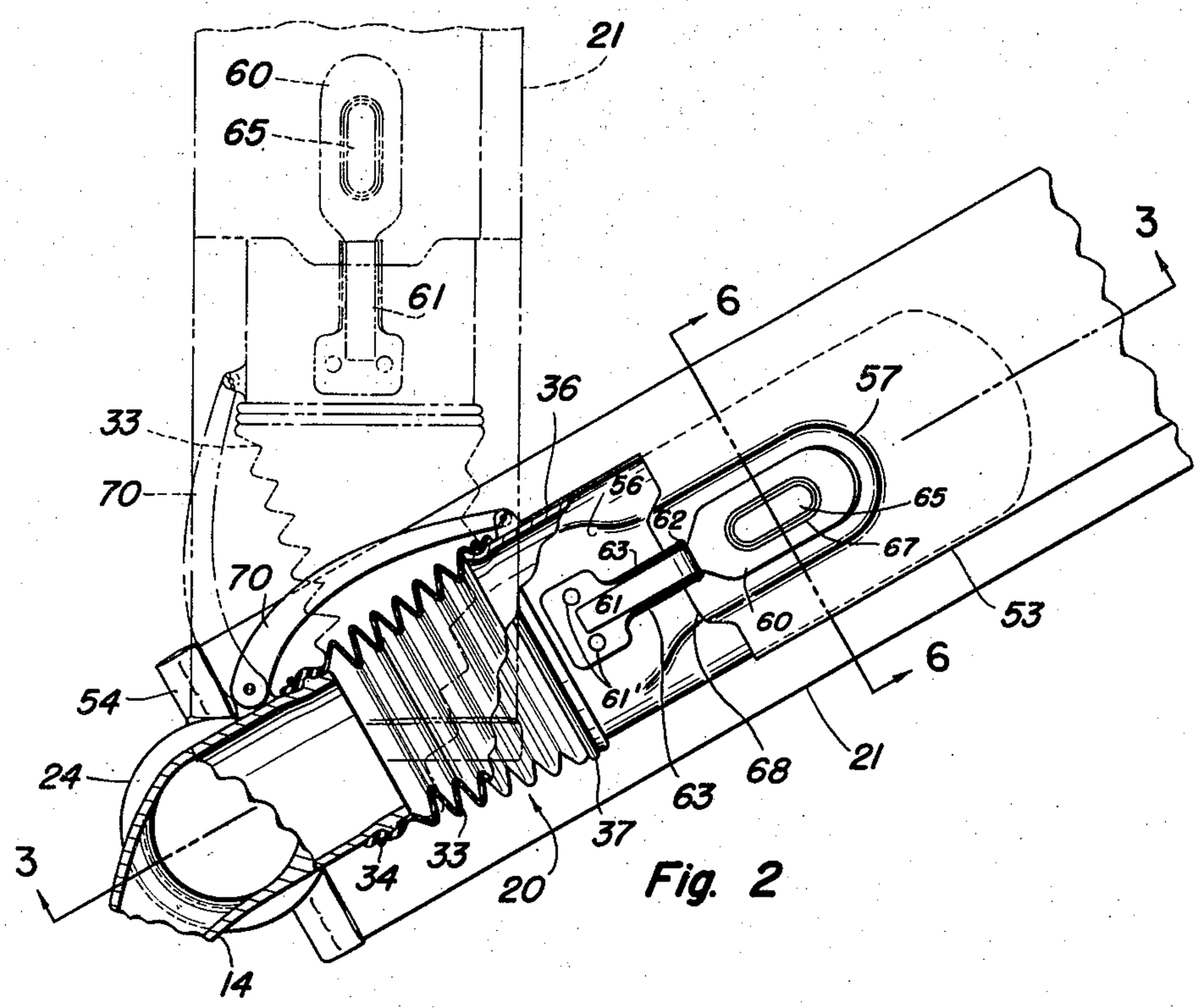

Fig. 2

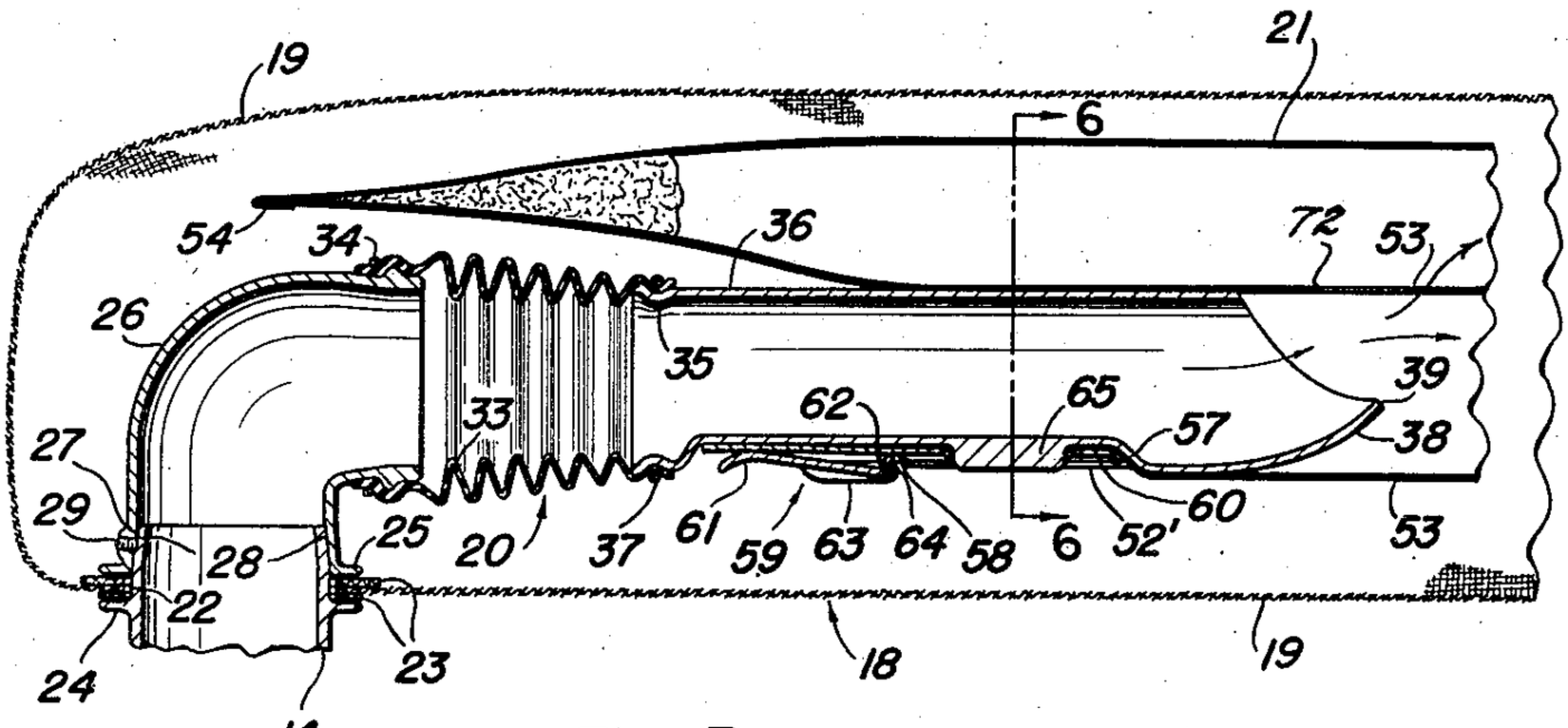

Fig. 3

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SUCTION CLEANERS

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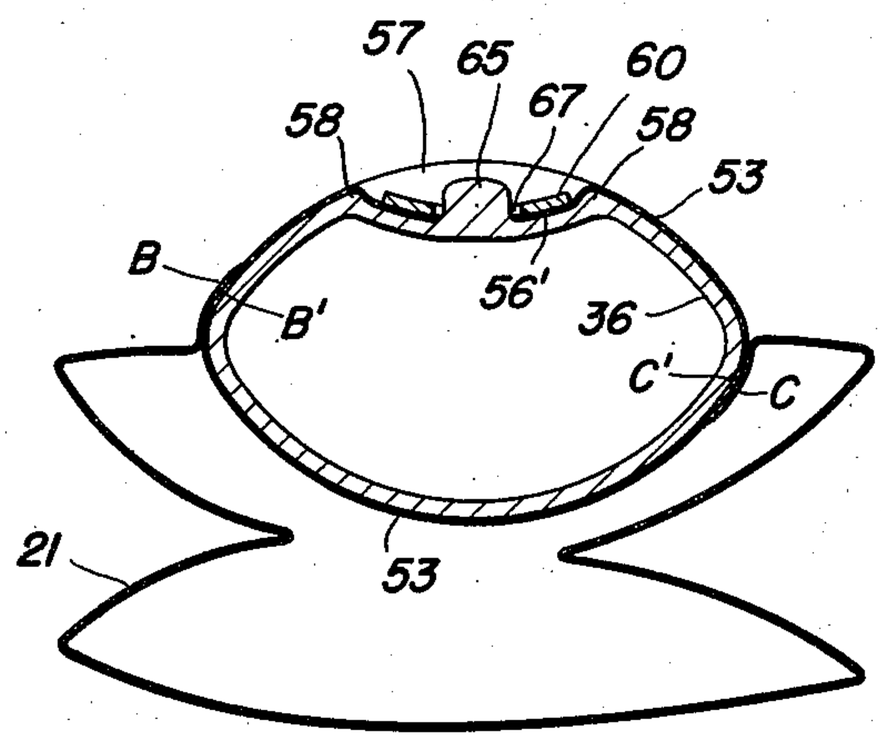

Fig. 6

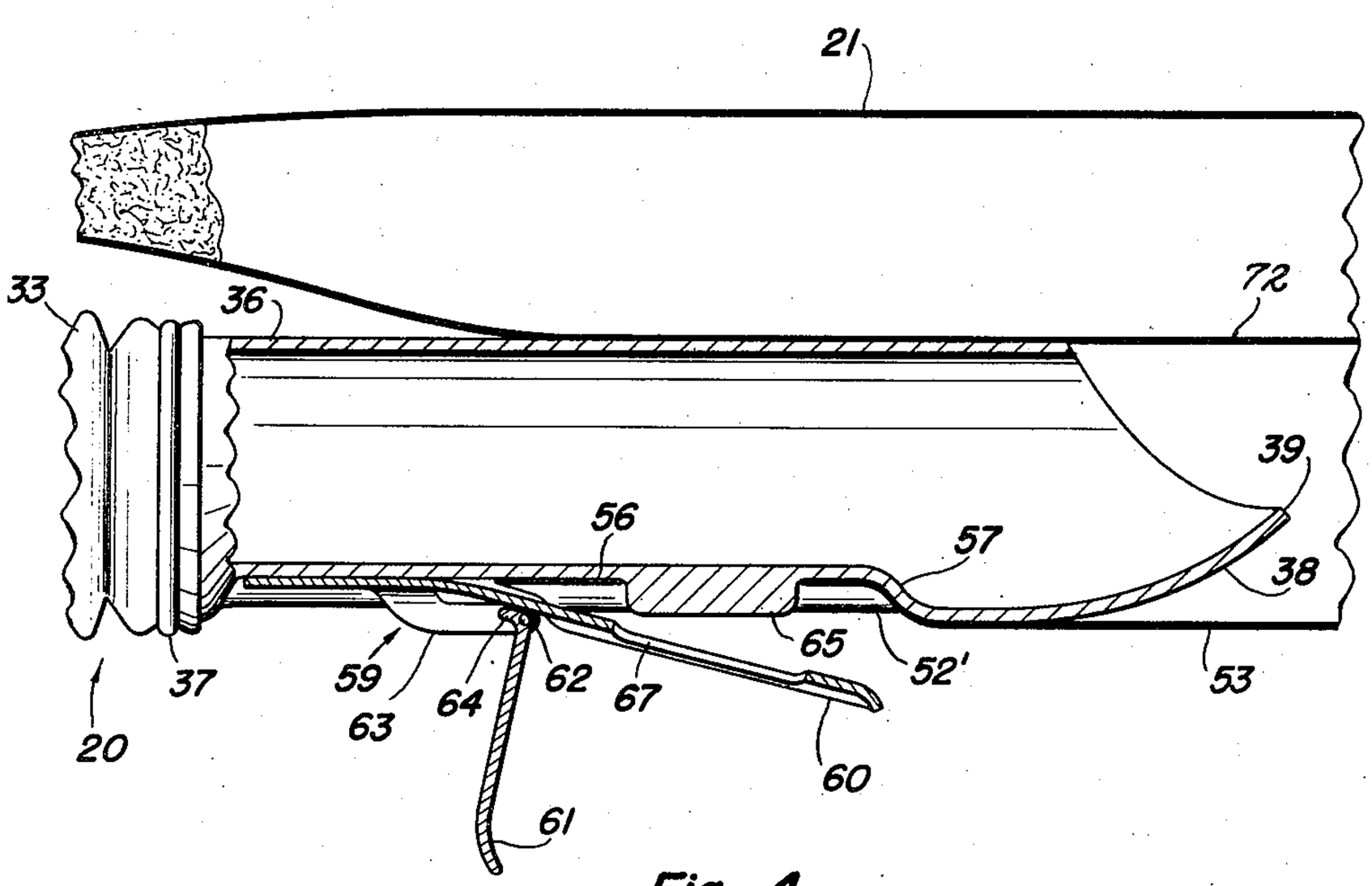

Fig. 4

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SUCTION CLEANERS

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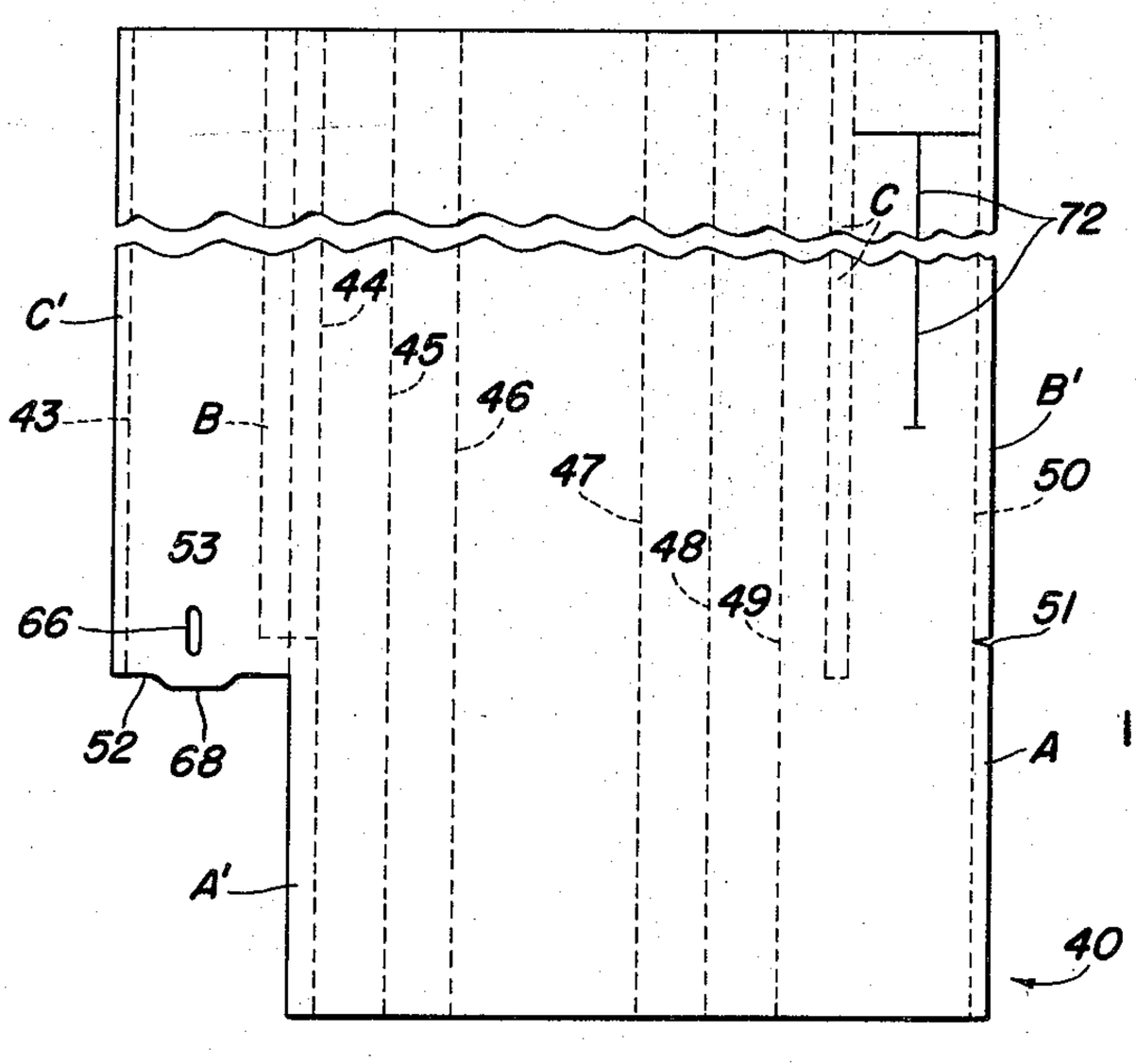

Fig. 7

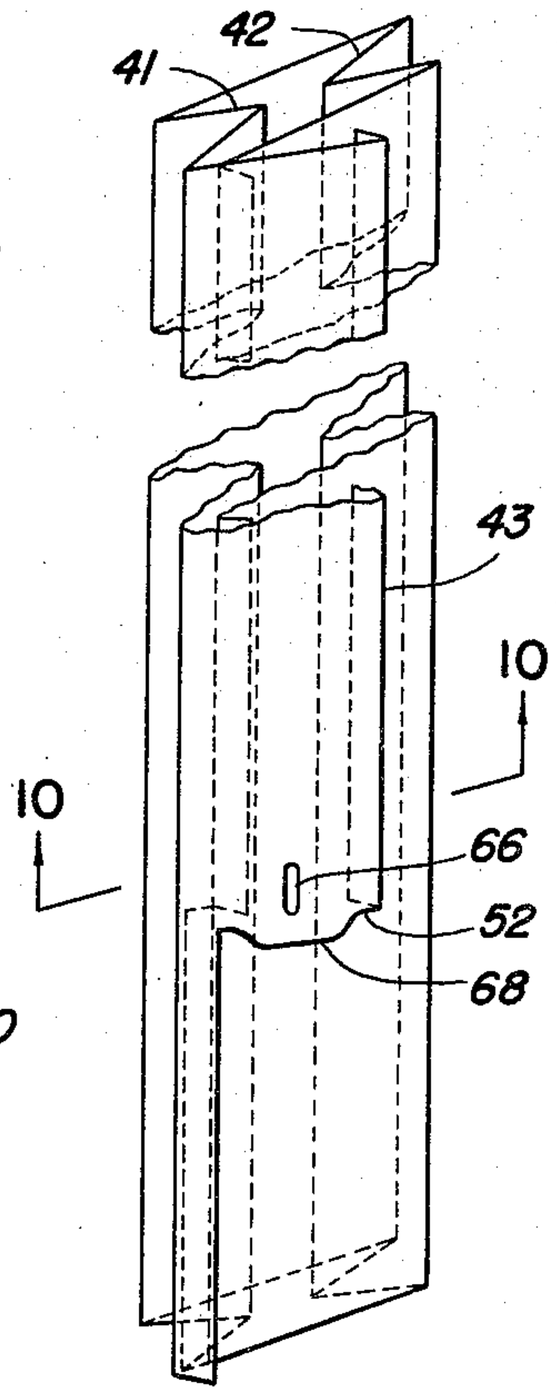

Fig. 8

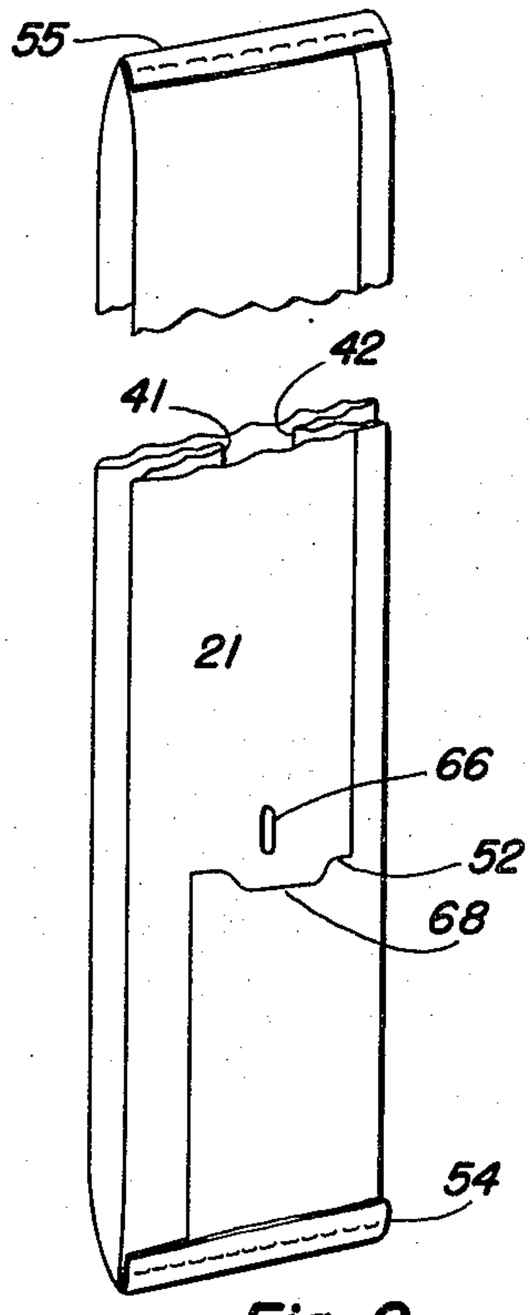

Fig. 9

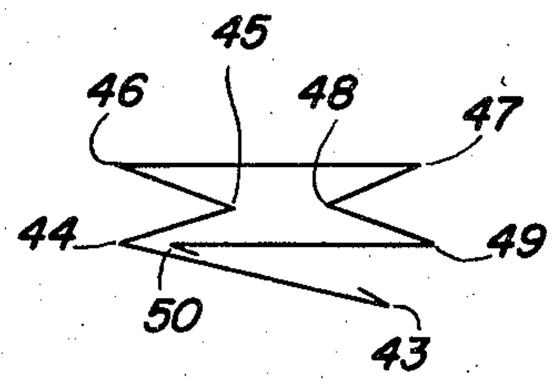

Fig. 10

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United States Patent Office

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SUCTION CLEANERS

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Application January 26, 1953, Serial No. 333,110

20 Claims. (Cl. 183—36)

This invention relates to suction cleaners and more particularly to the combination therewith of a novel filter assembly including a unique disposable filter, a low cost adapter therefor, and a simplified means for locking the filter in assembled position on the adapter.

One of the principal features of this invention is a non-reusable paper filter bag constructed from a single sheet of air pervious filter paper. The unique design and mode of fabrication is such that a roll of the paper stock can be fed through automatic bag making machinery where it is blanked, creased, folded, glued and sealed in a continuous process at high speed. The resulting product comprises an elongated pleated bag sealed at its ends and having a tubular inlet along one side wall formed from the overlapping longitudinal edges of the stock. This inlet opens upwardly into the top end of the bag and the dirt settles into a pocket at the bottom of the bag where it remains undisturbed by the incoming air stream.

Another feature of the invention is a specially designed adapter and clamp for detachably coupling the filter inlet to the cleaner's exhaust air conduit. A preferred adapter construction has a filter seating end of elliptical cross section. One side wall has an elongated channel positioned to underlie the filter inlet when in place on the adapter and into which the inlet can be gathered by a simple spring strip clamping element. An upstanding boss in the bottom of this channel projects through an opening in the wall of the filter inlet positively locking the filter against withdrawal from the adapter so long as the clamp is closed. The clamp itself consists of a cantilever spring having its free end overlying the channel and its other end anchored to the lower end of the adapter. The clamp is held closed by a simple over-center keeper lever.

The adapter assembly is flexibly coupled to the cleaner exhaust air conduit opposite the lower side wall of the filter. The adapter and filter are enclosed by an appearance envelope arranged to pivot freely about the exhaust conduit and along with the propelling handle in a manner which will be explained in detail below.

Accordingly, it is an object of the present invention to provide a new and simplified filter assembly for a suction cleaner utilizing a unique low cost filter bag.

Another object is the provision of a novel paper filter bag made from a single sheet of paper and having a tubular inlet formed from over-lapping portions of the longitudinal sides of the bag.

A further object of the invention is the provision of a simple adapter and clamping device for holding the filter in place thereon and including positive mutually interlocking means on the adapter and filter safe-guarding the filter against accidental withdrawal from the adapter.

Yet another object is the provision of a filter clamp consisting of a cantilever spring and a one piece self-locking keeper therefor.

Numerous other objects and advantages of the invention will manifest themselves from the following detailed specification of an illustrative embodiment taken in connection with the accompanying drawings, wherein:

Figure 1 is a side view of a floor type suction cleaner embodying the invention;

Figure 2 is a fragmentary side view partly in section showing the lower end of the filter assembly with the appearance envelope removed;

Figure 3 is a sectional view through the lower end of the filter assembly taken along line **3—3** on Figure 2;

Figure 4 is a fragmentary view similar to Figure 3 but showing the filter clamp in open position;

Figure 5 is a perspective view of the appearance envelope;

Figure 6 is a cross sectional view through the adapter conduit and filter bag along line **6—6** on Figure 3;

Figure 7 is a plan view of the paper blank employed in making the filter bag and showing the crease lines and the strips to which glue is applied;

Figure 8 is an isometric view of the folded blank in readiness for the gluing of its longitudinal seams;

Figure 9 is an isometric view of the completed filter; and

Figure 10 is a cross sectional view of the filter along line **10—10** on Figure 8.

A suction cleaner embodying the several novel features of the invention is generally illustrated in Figure 1. Since the details of the cleaner, other than the relationship of my filter assembly thereto, do not constitute a feature of the invention and are well known, it will be unnecessary to describe them in detail here. However, it is to be understood that the cleaner is of the same type disclosed in Figures 1 to 5 of my co-pending application for Letters Patent, Serial No. 299,210, filed July 16, 1952, for Improvements in Suction Cleaners.

The cleaner generally indicated by numeral **10** includes a downwardly facing suction nozzle **11** across the front end of the body and is supported by a pair of front and rear wheels **12** and **13**, respectively. The electric driving motor is housed within the body and has a shaft projecting longitudinally thereof and through a fan chamber extending crosswise of the body between the front wheels **12**. The exhaust air conduit **14** of the fan chamber projects laterally from the body at a point above one of front wheels **12**. A cleaner propelling handle **15** has a bail **16** at its lower end straddling the cleaner body and pivotally connected thereto by cap screws **17**.

The filter assembly generally designated **18** extends along side the handle to which its upper end is connected by a tension spring **19** while its lower end is freely journaled on the outer end of exhaust air conduit **14**. Referring to Figure 3, it will be seen that the principal components of the filter assembly include an outer appearance bag **19**, a filter adapter assembly generally designated **20**, and a paper filter bag **21**.

Appearance bag **19** may be made of any suitable air pervious material, such as cloth or perforated plastic, and has the general configuration illustrated in Figure 5. The lower end of the inner side wall is provided with a circular opening **22** somewhat larger than the diameter of conduit **14**. A pair of suitable bearing and gasket rings **23** are secured to the inner and outer faces of opening **22** and cooperate with a flange **24** projecting from conduit **14** and a flange **25** projecting from elbow **26** to provide a freely pivoting joint between envelope **19** and conduit **14**. The inlet end of elbow **26** has a flaring surface **27** seating against a complementarily formed seat **28** on the outer end of exhaust conduit **14** to which it is held by a set screw **29**.

Extending lengthwise along the top edge of the appearance bag is an opening which is normally held closed by a hookless fastener **30**. This fastener can be opened by

pulling upwardly on tang 31. The upper end of the bag may be held permanently closed, as by spring clip 32.

Filter adapter assembly 20 includes a flexible rubber bellows 33 having its lower end secured to the discharge end of elbow 26 by a wire clamp 34. The upper end of the bellows is likewise seated in a groove 35 of a filter adapter tube 36 and to which it is permanently secured by the wire band 37. It will, of course, be appreciated that the rubber bellows 33 may be replaced by any other suitable type of flexible connection between the exhaust air conduit and the filter adapter tube 36 so that the latter may swing through a vertical arc of approximately 90 degrees and in unison with the cleaner propelling handle. It will also be obvious that conduit 36 may also be formed integral with elbow 26 and that the latter can have a swivelling connection about the end of exhaust conduit 14.

Filter adapter conduit 36 is preferably elliptical in cross section, as illustrated in Figure 6, with its longer axis extending in a vertical plane laterally to one side of filter bag 21. Its upper discharge end is preferably provided with a rounded dirt deflector 38 terminating in a lip 39 which together serve as a pilot for opening the inlet tube of the filter bag to guide the tube onto the adapter. The filter clamping means with which the adapter tube is provided will be better understood following a description of my novel filter bag.

The paper filter bag is illustrated in Figures 7 to 10, and is preferably fabricated from a single sheet or blank 40 of suitable air pervious filtering paper having the unfolded contour illustrated in Figure 7. This blank may be cut from a roll of filter paper having a length equal to the width of the blank so that the only waste consists of the small rectangular piece cut from the lower left hand corner. A web of paper from the roll is fed through a filter making machine of well known construction and known in the industry as a "tuber." As the web of paper passes through the machine, suitably disposed knives blank out the rectangular section from the lower corner, the opening 66, and form a T-shaped slit in the upper right hand corner. Other parts of the machine crease the blank lengthwise thereof to form inwardly extending pleats 41 and 42 along the opposite sides of the bag so that it may be compactly folded in a flat condition for storage and shipment. These crease lines are indicated by reference characters 43 to 50, inclusive. Note that all of them are parallel to one another and that each extends for the full length of the blank with the exception of crease 50 the lower end of which terminates at notch 51 extending inwardly from the right hand edge of the blank. As will be best understood by comparing Figures 7 and 10, crease lines 45, 43 and 50 are opposite to the other crease lines for obvious reasons.

As blank 40 continues to pass through the bag making machine, glue is applied in narrow bands extending parallel to one another lengthwise of the blank. The application of the glue is preferably performed while the sheet is in a flat web since certain strips of glue are on one face of the web and others are on the opposite face. The length and locations of these strips of glue are best shown in Figure 7 and are designated by the letters A, B and C and by these same three letters primed. These glued areas are so arranged that when the blank is pleated and folded to the position shown in Figure 10 and then passed between rollers, strips A, B and C will mate with the correspondingly glued strips A′, B′ and C′, respectively. The bag is completed by turning the opposite ends 54 and 55 back against the body of the bag and stitching or gluing them in place to form a completely closed filter bag which cannot be opened to remove the dirt.

From the foregoing it will be clear that the completed bag comprises a large diameter main body and a relatively small diameter inlet tube 53 extending along one side of the main body. Moreover, the adjacent sides of the main body and inlet tube have a common wall extending the full length of the inlet tube. In consequence, the inlet tube is formed by the simple expedient of overlapping the longitudinal edges of the blank sufficiently to form the opposite walls of the tube. The upper end of this tube is closed as an incident to the closing of the upper end 55 of the filter proper. The lower rim 52 of the inlet tube is free of glue and can be pulled outwardly away from the body of the bag by means of tab 68 to provide an opening through which the rounded or pilot end 38 of the adapter can be inserted.

An important feature of the filter bag concerns the mode of providing an opening between the upper end of inlet tube 53 and the interior of the filter bag proper. This opening may consist simply of a large area opening through the upper end of the common wall between the main body and tube 53. However, this opening is preferably made by slitting this common wall to form flaps which open inwardly in response to air flow and thereafter tend to resume their original position thereby providing a self-closing dirt valve. Manifestly, the common wall may be slit in various ways to serve this purpose. However, a T-shaped slit 72 disposed as indicated in Figure 7 has been found particularly advantageous. Thus, the leg of the slit extends vertically midway between the opposite sides of the inlet tube, while the head portion of the slit extends crosswise of the common wall at a point somewhat below the upper end of the filter. The flaps so formed along the opposite sides of the vertical portion of the slit tend to remain in a common plane to close the inlet to the main body of the bag but flex inwardly readily in response to air pressure to provide a large and unrestricted opening into the bag.

The self-closing valve is of particular utility during and after the removal of the dirt filled filter bag from the cleaner since the valve functions to seal the only outlet to the bag and to prevent the escape of dirt even though the bag is up-ended or tossed about. This follows from the fact that the flaps of the valve return to their normal flat position automatically whenever the cleaner is de-energized. Moreover, the dirt contained in the bag holds the flaps firmly against the opposite outer wall of the inlet tube. Hence, any tendency of the dirt to escape or to open the flaps outwardly only serves to close the valve more securely.

From the foregoing description of the filter bag itself, it will be evident that a special clamping device is required to hold the inlet tube assembled over the end of adapter conduit 36. This is for the reason that it is impossible to surround the inlet neck with a clamping ring or its equivalent as has been customary heretofore in clamping the inlet of filters to the adapter assembly. This problem is solved in a very simple and efficacious manner by the novel clamp forming a feature of this invention.

Referring to Figures 2, 3 and 6, it will be seen that the side wall of adapter conduit 36 is provided with a channel 56 the upper end 57 of which is shown as merging with the exterior surface of the adapter short of the upper end thereof. However, channel 56 may extend the full length of conduit 36, if desired. The lower end of channel 56 flares outwardly toward the opposite edges of the adapter near the lower end thereof. The opposite upper edges 58 of channel 56 are rounded as best shown in Figure 6 so as not to cut through the paper walls of the inlet tube as it is clamped to the adapter. Moreover, and of particular importance, the circumferential distance about the exterior surface of adapter conduit 36 and including the surface of channel 56 is considerably greater than the circumference of the adapter disregarding the channel. The significance of this will be readily apparent when it is realized that the filter inlet is clamped to the adapter by gathering it into channel 56 circumferentially of the adapter by a spring clamping device.

The special clamping device generally designated 59 comprises a cantilever leaf spring 60 having its lower

end secured to the lower end of the adapter as by a pair of rivets **61**. The sides and free end may be rounded to conform generally to the cross sectional contour of channel **56**, as best shown in Figure 3. When the free end of spring **60** is in its normal unstressed condition illustrated in Figure 4, it lies entirely outside the channel. However, when the filter is in place on the adapter the free end of the clamping spring is depressed into the channel **56** and locked in closed position by an L-shaped keeper member **61**. This keeper is pivotally mounted on a pin **62** supported in the ends of a pair of supporting arms **63** struck upwardly from the opposite sides of spring **60**. The shorter leg **64** of the keeper is positioned at right angles to the longer leg as best shown in Figures 3 and 4. It will therefore be obvious that when the keeper is in the position illustrated in Figure 3, shorter leg **64** bears downwardly against spring **60** at a point rearward of pin **62** so as to lock the latter firmly against the bottom of the channel. However, when the free end of the keeper is swung outwardly away from the adapter tube to the position shown in Figure 4, spring **60** is free to flex to its normal unrestrained position completely out of the channel.

Projecting upwardly from the bottom of the channel is a boss **65** positioned to register with a similarly shaped opening **66** in the outer wall of filter inlet tube **53** when the latter is properly seated on the adapter tube. Clamping spring **60** also has an enlarged opening **67** which fits loosely about the sides of boss **65** as the clamp is moved to its closed position by keeper lever **61**. As will be observed from Figures 3 and 6, the top surface of boss **65** is even with or slightly below the outer surface of the adapter tube so that the filter inlet can be slid freely thereover without interference with the boss as it is telescoped over or withdrawn from the adapter tube. It will therefore be self-evident that when opening **66** is held seated about the base of boss **65** by spring **60**, the filter is firmly locked in place on the adapter tube and cannot be withdrawn.

The assembly of the filter onto the adapter tube is accomplished in the following simple manner. The operator first makes certain that clamp **60** is in the open position shown in Figure 4. The lower end of the adapter tube is then held in one hand as the operator grasps tab **63** projecting from the open end of inlet tube 53 with the other hand and opens the inlet as the pointed pilot of the adapter is inserted thereinto until opening **66** registers with boss **65**. The operator then presses keeper **61** downwardly against the adapter causing short leg **64** to depress spring **60** to the closed position shown in Figure 3. The movement of the spring leaf into channel **56** serves to gather the inlet tube of the filter circumferentially about the walls of the adapter tube to grip the walls of the adapter in a firm and air tight manner. The appearance bag may now be fitted about the exterior of the filter and adapter after which the opening **30** along the top side thereof is closed by pulling the tab **31** of the hookless fastener downwardly. The cleaner is now in readiness for operation.

The cleaner, of course, operates in the usual manner to entrain dirt in the suction air stream which is then discharged by the suction fan through the discharge conduit **40**. This air passes through elbow **26**, bellows **33**, adapter conduit **36**, inlet tube **53** and is discharged into the upper portion of the filter bag through the self-closing valve formed by slits **72**. The air escapes through the porous side walls of filter **21** while the dirt falls into the collecting pocket at the lower end of the filter. Since the incoming air stream enters the bag at a considerable distance above the dirt pocket, there is no tendency for the incoming high velocity air stream to stir up the dirt which has already settled to the bottom of the bag.

As the propelling handle is pivoted about pins **17** on the cleaner body, it will be clear that the entire filter assembly pivots in unison therewith. Thus, opening **22** at the lower end of appearance bag **19** pivots freely about exhaust conduit **14** between the annular flanges **24** and **25**. And, of course, the flexible bellows **33** permits the adapter conduit **36** and the entire filter bag to swing in a vertical plane along with the appearance bag and without flexing any part of the filter. Since it is desirable that bellows **33** be as flexible as possible to insure that the paper filter will swing with the appearance bag without flexing any part of the filter, it is desirable to provide a rigid link connection **70** pivotally interconnecting the adjacent ends of elbow **26** and adapter tube **36** as clearly illustrated in Figure 2. It follows that the adapter conduit is free to pivot in a vertical plane about an axis very close to that of exhaust air conduit **14**. Link **70** also serves to support adapter **36** in properly spaced relation with respect to the end of elbow **26** and is particularly useful in preventing the weight of the dirt in the filter from collapsing the bellows **33**.

When the filter is filled to capacity, it may be replaced by a fresh bag in the following manner. The appearance bag is first opened by pulling tab **31** upwardly to expose the filter bag **21**. Keeper **61** is then pulled outwardly to its open position to release the filter bag so that it may be withdrawn from the adapter tube. As soon as it is removed from the adapter, the weight of the dirt closes the inner and outer walls of tube **53** against one another and also presses the valve flaps against the outer wall of this tube so that dirt cannot possibly escape. The bag may then be disposed of in any convenient manner. A new filter is then installed as described above and the cleaner is ready for further service.

From the foregoing description of a preferred embodiment, it will be evident that the invention provides a filter assembly and an arrangement thereof with a suction cleaner having many advantages over prior constructions. Thus, the construction makes it possible to utilize the full length of the appearance bag to house a large capacity disposable paper filter while safe-guarding the latter against flexure due to the pivoting of the propelling handle. This permits the use of light weight, inexpensive filter paper in the interest of greater economy without entailing the risk of premature failure or rupture of the bag before it becomes filled with dirt. It is also quite obvious that the bag may be substantially filled with dirt before being replaced since the dirty air is discharged into the top of the bag rather than through the accumulated dirt as has been customary in prior filter designs.

Manifestly, the invention may be practised by a great variety of constructions other than those described above. For example, the filter assembly may be embodied in the common type of floor cleaner having an exhaust air conduit projecting rearwardly thereof beneath the propelling handle. In this case, it is preferable to rotate the filter bag and adapter 90 degrees from the position shown in Figure 1 so that the adapter overlies the filter and is accessible from above for greater convenience in the assembly and removal of the filter. However, the location of the adapter below the filter has certain advantages and may be employed if desired.

And, of course, the filter bag itself may be made from more than one piece of paper. For instance, the outer side wall or panel forming inlet tube **53** may be formed from a separate rectangular piece of paper having inturned tabs extending along its longitudinal edges which are glued or otherwise secured to the sides of the main body of the bag along the strips designated C and B' in Figure 7. The upper end of this piece may also be sealed to the filter bag though this is unnecessary since this is accomplished when the upper end of the bag is closed by the overturned portion **55** thereof. The resulting bag is the full equivalent of that shown in Figures 7 to 10 since in both constructions the inlet tube **53**

comprises an inner wall in common with the main body of the bag and an outer overlying wall secured to the main body except at its inlet end.

While I have shown and described but one embodiment of my invention, it is to be understood that this embodiment is to be taken as illustrative only and not in a limiting sense. I do not wish to be limited to the particular structure shown and described but to include all equivalent variations except as limited by the scope of the claims.

I claim:

1. A paper filter bag for use on a suction cleaner comprising a tubular envelope formed from a single sheet of air pervious paper, the opposite edges of said sheet being folded toward one another so as to overlap laterally for a distance considerably less than the diameter of said envelope, said edges being secured to the adjacent portions of said envelope to provide a tubular inlet passage open at its opposite ends, said envelope having an opening between the interior thereof and said inlet passage adjacent one end thereof, and means closing the opposite ends of said envelope and one end of said inlet passage to provide a non-reusable filter having an inlet passage lying between said laterally overlapping portions thereof.

2. A paper filter bag for use on a suction cleaner comprising a tubular main body formed from air pervious paper, an opening through the side wall of said body, an air pervious elongated paper panel having one end overlying said opening, said panel being secured to the body of said bag except along the opposite end edge thereof whereby said panel cooperates with the underlying body portion of the bag to form an air inlet passage in communication with said opening and having an inlet end adjacent the unsecured edge portion of said panel, and means closing the opposite ends of said tubular main body.

3. A paper filter bag for use on a suction cleaner as defined in claim 2 wherein said air pervious panel is provided with an opening near but spaced from said unsecured edge thereof, said opening being adapted to interlock with a boss projecting laterally from a filter adapter of a suction cleaner when said inlet passage of said filter is telescoped thereover.

4. A paper filter bag for use on a suction cleaner as defined in claim 2 wherein said inlet passage extends lengthwise of said tubular filter body and discharges upwardly into the upper closed end of said filter whereby the lower closed end thereof forms a dirt collecting pocket below and removed from the air stream entering said bag through said inlet passage.

5. A paper filter bag for use on a suction cleaner, said bag comprising an elongated tubular envelope of air pervious paper, an inlet tube extending along the side wall of said bag having an inlet end opening downwardly toward the lower bottom end of said envelope on the exterior side thereof, one side wall of said passage comprising a wall in common with the side wall of said bag, the opposite side wall of said passage comprising a paper panel overlying said one side wall and being secured thereto except along the lower edge thereof, and an air discharge opening from the upper portion of said inlet passage leading into the upper interior portion of said filter bag.

6. A paper filter bag for use on a suction cleaner, said bag comprising a tubular envelope of air pervious paper closed at its opposite ends, means forming a tubular air passage extending along one side of said envelope and having one wall in common with said envelope, said common wall being slit to provide a valved air inlet leading into the interior of said envelope laterally through the wall of said tubular air passage, said valved inlet opening inwardly into said filter bag in response to air flow through said passage and being adapted to close in the absence of air flow through said passage, and means closing one end of said tubular air passage, the other end of said passage being open and adapted to be connected to the exhaust air conduit of a suction cleaner.

7. A non-reusable closed paper filter bag of air pervious paper for use on a suction cleaner, one wall of said bag having an air inlet opening formed by an elongated slit therethrough, means overlying said inlet opening and secured to the adjacent side wall portions of said filter bag so as to form a tubular air passage in communication with said air inlet opening at one end thereof, the other end of said tubular air passage means being open and adapted to be coupled to the exhaust air conduit of a suction cleaner for the purpose of conducting a dirt laden air stream to said filter bag through the elongated slit in the wall thereof.

8. A non-reusable filter bag having a self-closing valved inlet comprising, a tubular paper bag of air pervious material having an inlet opening formed in a side wall thereof by a slit shaped to provide a flap valve adapted to open inwardly in response to pressure on the exterior side thereof, thin flexible walled means secured to the exterior of said filter bag opposite said air inlet opening and cooperating with the wall of said filter bag to provide a tubular air inlet passage in communication at one end thereof with said air inlet opening, the other end of said tubular passage being open and adapted to be coupled to the exhaust air conduit of a suction cleaner, said flap valve tending normally to occupy a position in which said slit is substantially closed and to open inwardly toward the interior of said bag in response to an air flow into said tubular inlet passage through the open end thereof.

9. A non-reusable filter bag as defined in claim 8 wherein said other end of the air inlet passage is provided with an opening through the side wall thereof adapted to telescope over and interlock with a boss projecting laterally from the side wall of an exhaust air conduit for the purpose of holding said inlet passage against withdrawal from said conduit.

10. In combination, a tubular filter bag of air pervious paper closed at its upper and lower ends, an air inlet tube for said bag extending along one side thereof with the adjacent wall portions of said bag and inlet tube forming a common wall throughout the length of said inlet tube, said inlet tube opening upwardly into the upper end of said bag through said common wall and having an open lower end adapted to telescope over and to be clamped to the discharge end of a filter adapter, a filter adapter for coupling said filter bag to a suction cleaner, said adapter comprising an elongated open-ended conduit, and means for releasably clamping the inlet of said bag to said adapter comprising, a channel extending lengthwise along the outer surface of but terminating short of the discharge end of said adapter, said channel being positioned on the side of said adapter opposite the body portion of the filter bag, manually operable means carried by said adapter for depressing the overlying portion of said inlet tube into said channel so as to gather said inlet circumferentially thereof into air tight engagement with the adapter.

11. The combination defined in claim 10 including a low height boss projecting outwardly from the bottom of said channel and intermediate the ends thereof, the outer side wall of said air inlet tube having an opening therethrough adapted to register with and seat about the base of said boss, said clamping means being arranged to depress the portions of said inlet adjacent said opening about the base of the boss whereby said boss and said opening in the side wall of the inlet cooperate to lock the filter bag against withdrawal from the adapter so long as said clamping means is held depressed in said channel.

12. A filter assembly comprising, a tubular filter adapter having an inlet end adapted to be connected to the exhaust air conduit of a suction cleaner and to have

the inlet of a filter bag telescoped over and clamped to the opposite discharge end thereof, a tubular paper filter bag having an air inlet tube extending along one side thereof and having an open end formed in part by the side wall of the filter bag and in part by a panel having all edges except the edge forming a part of the open end of said inlet tube joined to the contiguous portions of said filter bag, the opposite end of said inlet tube opening into the interior of said filter, said adapter having a channel extending along its outer surface and underlying said panel, said inlet tube being adapted to telescope over the discharge end of said adapter, and manually operable clamping means for gathering said inlet tube tightly about said adapter circumferentially thereof and depressing the same into said channel to provide an air tight connection between said adapter and said filter bag.

13. A filter assembly comprising, an open ended filter adapter conduit having an inlet end adapted to be connected to the exhaust air conduit of a suction cleaner and a discharge end adapted to have the inlet of a filter bag telescoped thereover, a tubular paper filter bag having an air inlet tube opening through the side thereof intermediate its upper and lower ends whereby the lower end of said filter provides a dirt collecting pocket and the upper end serves as a dirt separation chamber, said inlet tube being formed in part by a portion of the filter side wall which portion extends downwardly below the inlet end of said tube and in part by an overlying panel joined to the contiguous portion of the filter side wall except along the inlet rim thereof, said adapter conduit having a channel extending along the outer surface thereof, and means for depressing portions of said panel into said channel so as to gather said inlet tube circumferentially about the discharge end of said adapter to provide an air tight connection between said inlet tube and said adapter.

14. A filter assembly as defined in claim 13 wherein said means for depressing portions of said inlet tube into said channel comprises a resilient strip having its lower end supported on said adapter at the lower end of said channel and a free end movable into and out of said channel laterally of said adapter, the free end of said strip being arranged to lie outside said channel when not forcibly depressed, and a manually operable control means for depressing the free end of said strip into said channel and holding it so depressed to clamp said inlet tube of the filter in place on said adapter.

15. A filter assembly as defined in claim 14 wherein said channel is provided with an outwardly projecting boss, the panel portion of said inlet tube having an opening therethrough positioned to mate with said boss when properly seated on said adapter, and said resilient strip having an opening in the free end thereof to receive said boss when said strip is depressed into said channel whereby the opening in said panel and said boss cooperate to lock said filter in assembled position on said adapter.

16. A filter assembly comprising an open ended filter adapter conduit having an inlet end adapted to be connected with the air exhaust conduit of a suction cleaner and a discharge end adapted to have the inlet of a filter bag telescoped thereover, a paper filter bag having an inlet tube adapted to telescope freely over the discharge end of said adapter, and means for releasably clamping said inlet tube in place on said adapter comprising an elongated channel extending lengthwise along one exterior side of said adapter at the discharge end thereof, a boss extending outwardly from the bottom of said channel a distance no greater than the depth of said channel so as not to interfere with the assembly of the filter inlet tube thereover, said inlet tube having an opening through the side wall thereof adapted to receive said boss when said tube is properly seated on said adapter and when said opening is in alignment with said boss, and clamping means carried by said adapter and overlying said channel, said clamping means, when open, lying outside said channel and including means for depressing a longitudinal portion of the wall of said inlet tube into said channel and to hold said opening seated about the base of said boss whereby the walls of said inlet tube are gathered circumferentially into air tight engagement with said adapter and whereby said opening and boss cooperate to lock said filter against withdrawal from said adapter.

17. A filter adapter for coupling a filter bag to a suction cleaner comprising, a tubular conduit adapted to have the inlet of a filter bag telescoped thereover, said conduit having a channel extending longitudinally along the exterior side thereof, clamping means for depressing the side wall of a filter inlet tube into said channel to gather said tube circumferentially thereof into air tight engagement with said adapter, said clamping means comprising a leaf spring having a free end overlying said channel so as to be movable into and out of said channel and a stationary end anchored to said adapter near one end of said channel, a self-locking control lever mounted on said adapter and operable to depress said spring into said channel and to lock the same so depressed when moved to one position thereof, said control lever being movable to a second position in which said spring is free to move to a substantially unstressed position outside said channel to permit the inlet tube of a filter bag to be telescoped over or withdrawn from said adapter without interference from said leaf spring.

18. A filter adapter as defined in claim 17 including a boss projecting outwardly from the bottom of said channel so that the end thereof lies close to the outer peripheral surface of said adapter, said leaf spring having a cutout in the free end portion thereof so that said spring may be depressed into said channel crosswise of the side walls of said boss, said boss being cooperable with an opening in the side wall of a filter inlet tube adapted to be seated over said boss as said clamping means is closed to lock said inlet tube assembled to said adapter.

19. In combination, a suction cleaner having a wheel supported main body, an exhaust air conduit projecting laterally therefrom, a propelling handle pivoted to said cleaner, a filter assembly having its lower end connected to said exhaust air conduit and its upper end supported on said handle and being pivotable with said handle about a pivot in the vicinity of said exhaust air conduit, said assembly including a paper filter bag, coupling means flexibly connecting said bag to the end of said exhaust air conduit, and an appearance envelope enclosing said filter bag and adapter and having an opening through the lower end thereof freely journaled about said exhaust air conduit to provide a pivoting connection between said cleaner and the lower end of said envelope.

20. In combination, a wheel supported suction cleaner having an exhaust air conduit projecting laterally therefrom, a propelling handle pivoted to said cleaner, a filter assembly having its opposite ends coupled to said conduit and to said handle so that said filter assembly and handle pivot in unison, said filter assembly including a tubular filter, a filter adapter having its lower end flexibly connected to said exhaust air conduit to one side and opposite the lower end of said filter and its upper end coupled to an inlet tube for said filter at the side thereof and at a point intermediate the ends of said filter, and an appearance envelope enclosing said filter and adapter and having its upper end connected to an upper portion of said propelling handle, the lower end of said appearance envelope having an opening therein adapted to be journaled about said exhaust air conduit so as to pivot freely thereabout as said handle is pivoted forwardly and backwardly with respect to said cleaner.

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