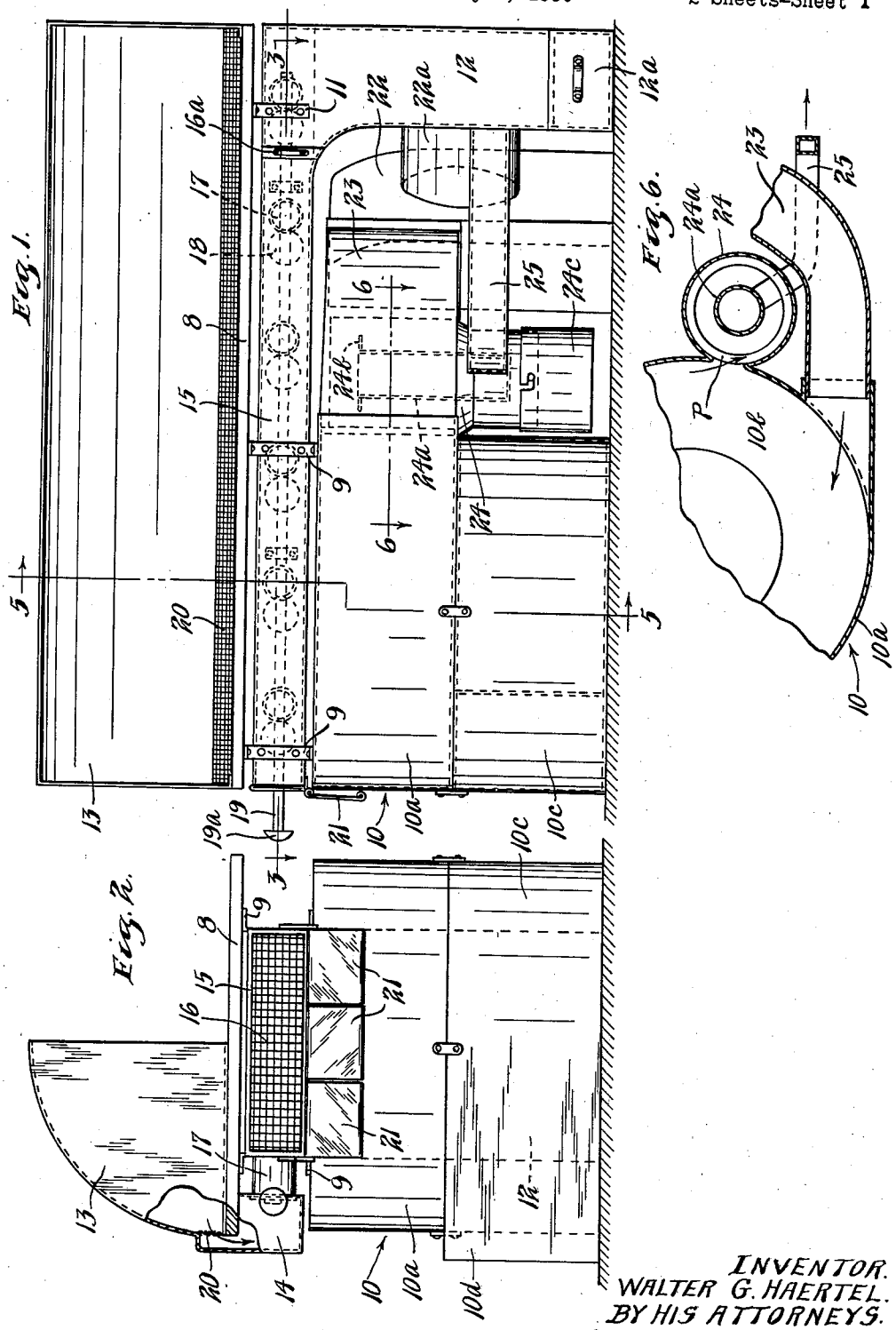
April 30, 1940. W. G. HAERTEL 2,199,372

METHOD AND APPARATUS FOR REMOVING PARTICLES FROM FUR ARTICLES AND THE LIKE

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Fig. 3.

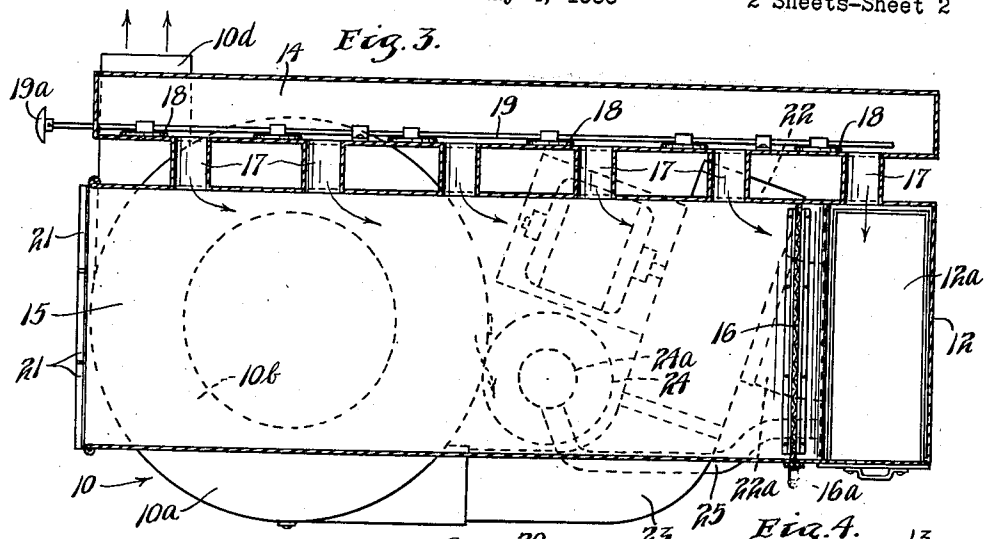


Fig. 4.

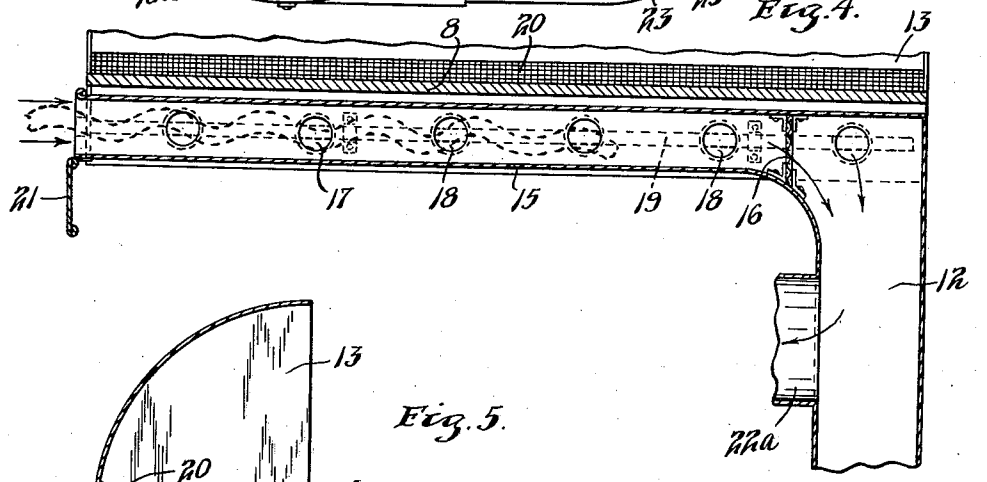
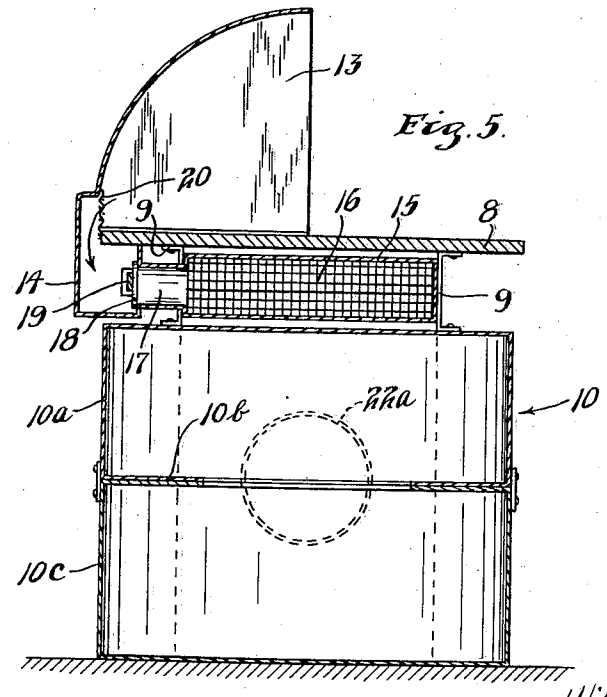


Fig. 5.



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METHOD AND APPARATUS FOR REMOVING PARTICLES FROM FUR ARTICLES AND THE LIKE

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6 Claims. (Cl. 15—14)

This invention relates to the cleaning and renovation of various materials and articles of flexible nature which it is usually impracticable to clean by washing methods. Such garments and articles of manufacture as furs, carpets, heavy draperies and the like are often cleaned by rubbing into the hair or nap absorbent particles, usually impregnated with cleaning fluids. These particles are sometimes rubbed into the fur or the heavy fabric by hand and are sometimes applied to the materials in a tumbling drum which mechanically produces the rubbing action. The absorbent particles collect and absorb oil films, soot and dirt deposits and other minute particles of accumulated foreign material. After the rubbing or tumbling action is completed, it is necessary to remove the granular cleaning material or particles and this is usually accomplished by brushing and whipping the garment or other fur piece or fabric which requires considerable effort and the consumption of a large amount of time.

In the cleaning of fur garments, heavy fabrics and the like, granular material such as saw dust, corn meal and other irregular particles have been extensively used. These particles cling tenaciously to the hairs of the fur and to the fibers and nap of fabricated articles.

It is an object of my invention to provide a simple and highly efficient method for quickly and positively removing such particles of cleaning materials as well as all other particles of foreign material adhering to the flexible articles of the type described.

It is a further object to provide a method of the type described which causes a thorough aeration and shaking or whipping action of the flexible articles effective in very quickly removing all particles of adhering foreign material and which further restores to such articles the original fluffiness.

It is a further object to provide a comparatively simple and highly efficient apparatus for carrying out my said method and for collecting the removed particles.

Another object is the provision of apparatus of the type described wherein an elongated shallow passage is provided connected at one end with a high power source of suction and having an open opposite end through which an article to be renovated may be projected longitudinally by holding one of its edges, this suction and rapidly moving current of air pulling the article longitudinally into the chamber and producing upon the article a shaking or whipping action whereby all surfaces thereof are completely aerated and the particles removed by suction.

A still further object is the provision of a complete apparatus for hand cleaning furs, garments, heavy fabrics and the like by applying thereto particles of cleaning material as well as detergents and wherein means are provided for withdrawing from the top of the table, toxic or sickening vapors from cleaning re-agents, the same source of suction being utilized for such purpose as is utilized in the particle removing chamber below the top of the table or bench.

These and other objects and advantages of the invention will be more fully set forth in the following description made in connection with the accompanying drawings, in which like reference characters refer to similar parts throughout the several views, and in which:

Fig. 1 is a front elevation of an embodiment of my improved apparatus, some of the interior parts being shown in dotted lines;

Fig. 2 is an end elevation of the apparatus with a small portion of the end of the hood broken away;

Fig. 3 is a horizontal section taken approximately on the line 3—3 of Fig. 1;

Fig. 4 is a vertical section showing the particle removing chamber just below the top of the table and its connection with a source of air suction;

Fig. 5 is a vertical cross section taken on the line 5—5 of Fig. 1, and

Fig. 6 is a fragmentary horizontal section taken on the line 6—6 of Fig. 1 showing the dust collector and its connection with the discharge of the blower.

In the form of apparatus illustrated, a bench or table is provided having a flat top 8 which may be supported in any suitable manner and which as shown is supported in part by means of brackets 9 from a large dust collecting drum 10 and which is supported at its right hand end by brackets 11 from a vertical hollow leg 12. The table top 8 is provided at its rear portion with a vapor collecting hood 13 as shown running the full length of the table top and having communication just above the rear edge of top 8 with a longitudinal duct 14 which is connected as will later be described, at several points with the interior of a particle removing chamber subjected to strong suction.

The particle removing chamber referred to is in the form of a relatively shallow horizontal casing 15 which extends from the left hand end of the table to the upper end of hollow leg 12 and which communicates with said hollow leg at

its right hand end. As shown the casing 15 is of oblong cross section having its outer or left hand end open and provided at its right hand end with a transverse screen 16 which may be slidably projected from the front of leg 12 by means of a suitable handle 16a. The particle removing chamber defined by casing 15 communicates with the longitudinal duct 14 through a series of short transverse conduits 17 connecting the rear wall of casing 15 with the forward wall of the duct 14. Plate valves 18 are provided, one for each of the conduits 17, all being secured to a valve operating rod 19 which extends longitudinally through the duct 14 and is slidably mounted therein having an operating handle 19a disposed at the outer or left hand end thereof. The amount of communication of the duct with the particle removing chamber can thus be varied by manipulation of the valve 18. A narrow elongated screen 20 covers the entrance in the lower and rear portion of hood 13 to the longitudinal duct 14.

At the open end of the particle removing chamber 15 a series, as shown three, of hinged doors 21 are provided, hinged as shown, to the bottom of chamber 15 and of such width as to extend to the top of the chamber.

The central portion of the hollow leg 12 communicates with the intake passage 22a of a suction fan or blower 22. The discharge of blower 22 is connected by a conduit 23 with the upper section 10a of the dust collector drum 10. The upper section 10a has a closed top and a large central opening in its bottom providing a substantial annular dust collecting flange 10b. The lower section 10c of the dust collector drum has an open upper end and is provided with a more or less tangentially disposed discharge 10d which is directed rearwardly of the apparatus and which may communicate with a conduit if desired leading outside of the building in which the apparatus is located. The peripheral wall of the upper section 10a of the dust collector drum is provided with a relatively narrow passage P which communicates with a dust collecting cylinder 24 of relatively small diameter. Most of the particles and dust drawn from the particle removing casing 16 by suction are collected in the cylinder 24, the particles and dust swirling around the interior of drum section 10a by centrifugal force and passing into the cylinder 24. Within dust collecting cylinder 24 is an axially disposed tube 24a closed at its lower end and open at its upper end and as shown provided with an annular flange 24b at its upper end which traverses most of the annular passage between tube 24a and the peripheral wall of the cylinder 24. The interior of tube 24a communicates at its lower portion with a conduit 25 connected with the hollow leg 12 adjacent the intake connection of said leg with the blower. The bottom of cylinder 24 as shown is in the form of a detachable cup member 24c which may be secured to the body 24 by bayonet joint connection and which is removable to dispose of accumulated particles and dust. The hollow leg 12 has a removable drawer 12a in the lower portion thereof adapted to be removed for disposing of any accumulated heavy material which drops to the bottom of the leg and is not drawn through the blower.

Operation

For removing particles of cleaning preparation and other foreign material from garments and articles such as furs, heavy fabrics and the like, the garment or article is held by one end and the free end inserted into the open end of chamber 15. The operation of the blower 22 produces a strong suction on the inner or right hand end of the particle removing chamber. The velocity of air and the degree of suction may be varied by adjusting the valves 18 by means of the operating handle 19a. When the valves are completely closed all air will be drawn from the open end of the particle removing chamber. It is usually desirable to have the valves at least slightly open. The strong suction longitudinally of the article to be renovated draws the article longitudinally into the chamber holding it in more or less horizontal position and in addition producing flapping or shaking action throughout the length of the entire garment as it is being held by its outer or left hand end. The introduction of some air through the short conduits 17 intensifies this shaking action. The rapid vibrative or shaking action in cooperation with the strong suction produced longitudinally of the chamber 15 frees the particles of cleaning preparation and other particles of foreign material adhering to the hair or nap of the articles being renovated and very quickly effects the removal of all such particles. The shaking or whipping action may be lessened materially by opening the passages or conduits 17 to the fullest extent thereby materially reducing the vacuum. In Fig. 4 the shaking action of the garment is illustrated by the dotted lines.

The foreign matter removed from the garment, with the exception of the very large pieces of material, passes through the screen 16 into the upper end of the hollow leg 12. Some of the heavier particles drop to the bottom of the leg and are collected in the tray 12a while the greater portion of the removed particles are drawn into the blower through its intake 22a and are discharged through the conduit 23 into the upper section 10a of the collector drum 10. The particles are caused to swirl about the peripheral wall of the section 10a because of centrifugal force and are collected in the small cylindrical collector 24 dropping to the cup bottom 24c which is removable. The large amount of circulated air is discharged from the bottom section 10c of the collector drum through the discharge 10d and the interior of the air tube 24a of the cylindrical collector communicates with the hollow leg 12 and intake of the blower, thus withdrawing air to relieve the pressure in the cylindrical collector 24.

It will be seen that the screen 16 in the inner end of the particle removing chamber may be slidably withdrawn to remove any large material which has been screened thereby and that the collected particles, dust, etc., may be disposed of by removing the drawer 12a at the bottom of leg 12 and the cup bottom 24c of the cylindrical collector 24. It is thus possible to retrieve most of the cleaning preparation for re-use if desired.

In the cleaning of heavy garments, furs, heavy drapes and small rugs, it is often desirable to hand clean or spot portions of the article before removing the cleaning preparation. With my apparatus the articles may be laid upon the table top 8 and additional cleaning preparation or liquid cleaning re-agents applied there. Many of these cleaning re-agents have sickening and some even toxic fumes. When the apparatus is utilized for hand cleaning the blower is operated and the doors 21 or some thereof at the open end of the

particle removing chamber are closed, being held in closed position by the suction produced and the valves 18 in the communicating conduits 17 are then opened to cause most of the air to be drawn from beneath the hood 13. Fumes are thus quickly drawn off and prevented from annoying the operator.

From the foregoing specification and description of the operation it will be seen that I have provided a method for removing particles of foreign material adhering to flexible articles of manufacture such as furs, heavy fabricated garments, carpets and the like which consists in subjecting one end of a narrow elongated passage to a source of considerable suction or vacuum and then holding an article to be treated by one of its ends and inserting the opposite and free end into the opposite end of the passage to cause the vacuum at the opposite end of the passage to draw the article inwardly longitudinally of the passage and to shake or whip the article as its surfaces and nap or hairs are subjected to the strong vacuum, the combined shaking or whipping action of the garment and the suction to which the article is subjected removing all foreign particles and substances which cling to the article.

It further will be seen that in this method the introduction of some small amounts of air at various points in the length of the passage produces a greater shaking or whipping action on the article.

Stated another way, I subject a flexible article containing adhering particles to the action of a strong vacuum in a confined narrow space and with the vacuum applied at one point in said confined space while the article is held by one of its edges at some distance from the point of application of the vacuum to thereby pull the article longitudinally while imparting to the flexible article a whipping or shaking action and subjecting the article to aeration and suction.

From the foregoing description it will be seen that I have provided a new and improved method for very quickly removing particles of foreign material from furs, garments, heavy fabrics and the like which will minimize the time required for renovation of such articles and which further will result in the collection of the removed particles.

It will further be seen that I have provided a very satisfactory and highly efficient apparatus for carrying out my improved method which apparatus is designed to collect all removed material and in addition to be utilized for hand cleaning methods to the end that fumes from cleaning re-agents may be withdrawn and prevented from getting into the eyes and respiratory tract of the operator.

In addition to removing the particles of cleaning material and other foreign ingredients adhering to the articles treated, the nap or hair of the articles and all surfaces are completely aerated and fluffed and thus reconditioned. This aeration and fluffing is of substantial importance in the renovating of fur garments and the like.

Where hereafter in the claims the term "fur articles and the like" is used, such term is used in its broadest sense to include any of the types of flexible garments, fabrics and other materials having surfaces, nap or hair to which foreign particles will naturally adhere.

What is claimed is:

1. Particle removing apparatus of the general class set forth comprising a casing defining an elongated straight relatively shallow chamber having an opening adjacent its outer end through which articles to be treated may be inserted, a suction fan connected with the inner end of said chamber for setting up a strong suction current longitudinally of said chamber, means adjacent the inner end of said casing for collecting material removed from articles subjected to said suction, and means for introducing air at an angle to said suction current.

2. Particle removing apparatus of the general class set forth comprising a casing defining an elongated straight relatively shallow chamber having an opening adjacent its outer end through which articles to be treated may be inserted, a suction fan connected with the inner end of said chamber for setting up a strong suction current longitudinally of said chamber, means adjacent the inner end of said casing for collecting material removed from articles subjected to said suction, said casing having a series of longitudinally spaced air intake passages, and means for regulating the openings of said passages.

3. Particle removing apparatus of the general class set forth comprising an elongated casing defining a particle removing chamber, said casing having an opening extending substantially the full width thereof adjacent its outer end through which articles to be treated may be inserted into said chamber, a suction fan having its intake connected with the inner end of said chamber for setting up a strong suction current longitudinally of said chamber, whereby a flexible article longitudinally projected into said chamber and held by the outer edge thereof will be shaken vibratively while suction and air currents are applied to the surfaces thereof, said casing having a plurality of air intake passages along a side thereof, and means for controlling the openings of said passages whereby controlled blasts of air may be directed into said casing laterally toward the article being cleaned.

4. The method of aerating and removing particles from relatively flat fur articles and the like, which consists in holding such an article by one edge thereof and subjecting said article to a strong source of suction applied longitudinally thereof to exert a longitudinal pull on said article and to simultaneously shake the same, and directing air toward said article at spaced points at an angle to the current of air produced by said source of suction.

5. Apparatus for cleaning fur garments and the like and for removing the particles therefrom having in combination, a table having a substantially flat working surface, an air conduit extending longitudinally of and below said table and having an open end disposed adjacent one end of said table for insertion of an article therein, said conduit forming a particle removing chamber, means connected with the opposite end of said conduit for setting up a suction therein to produce a vibration on the article held therein, a hood extending along the rear of said table and overhanging a substantial portion of said table, said conduit having communication with the air below said hood for withdrawal of fumes and light material collected beneath said hood.

6. The method of aerating and removing particles from a fur or similar sheet-like article, which consists in holding the article from one end, subjecting both sides of the article to a strong air current supplied substantially parallel to said sheet-like article to cause the free portion of the article to vibrate, shake or whip in a series of

undulations and then intermittently in succession suddenly stopping the vibration, shaking or whipping of portions of the article in one direction laterally of the article as they approach the limit of such lateral undulatory motion, and then suddenly stopping the vibration, shaking or whipping of said portions of the article in the opposite direction laterally of the article as said portions approach the other limit of said lateral undulatory motion.

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