Jan. 9, 1968 F. S. THOMAS, JR 3,363,276

COMBINED LINT REMOVER AND FABRIC COMBER

Filed Oct. 18, 1965

Fig. 1

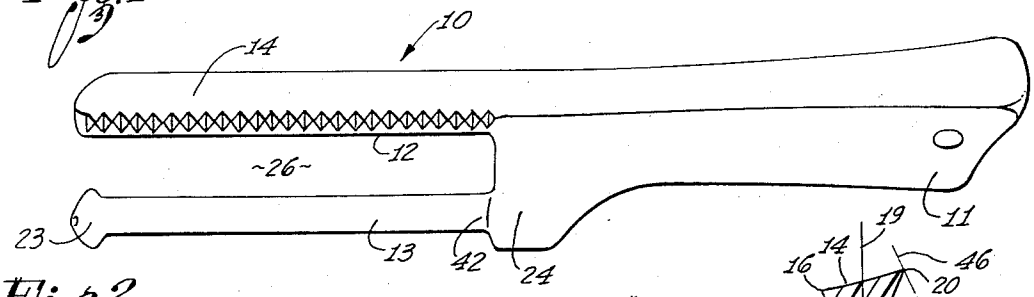


Fig. 2

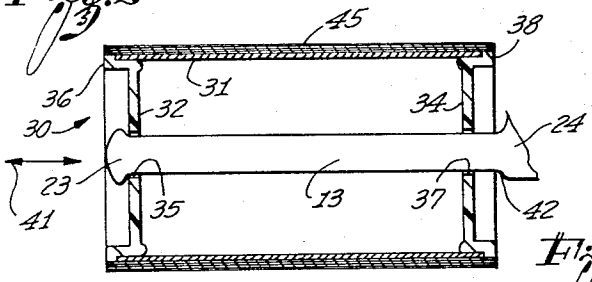


Fig. 3

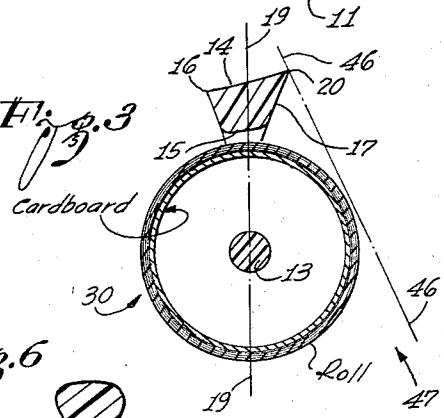


Fig. 6

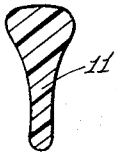


Fig. 4

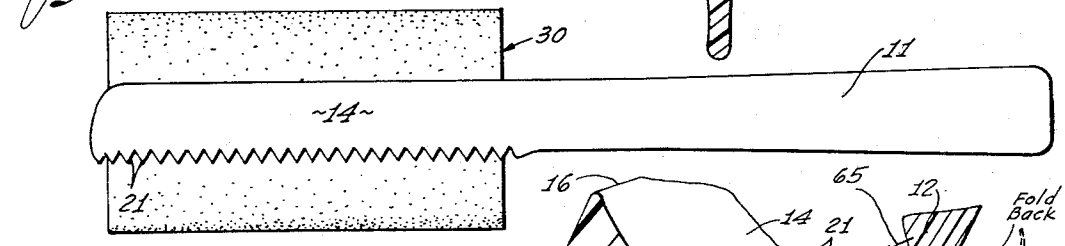


Fig. 5

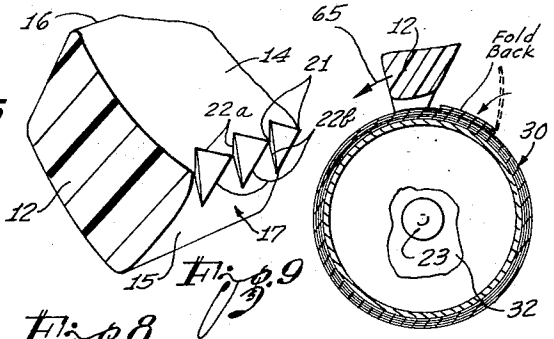


Fig. 7

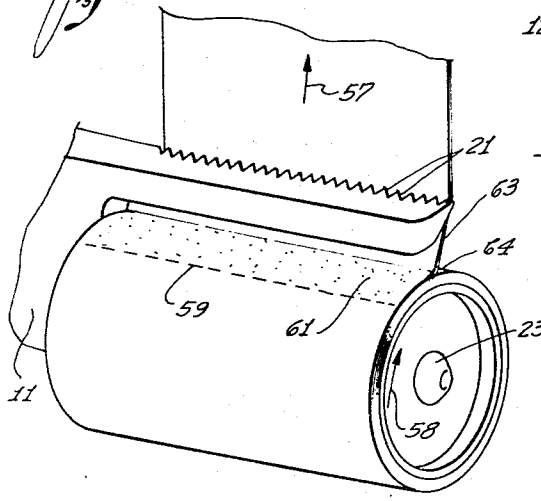


Fig. 8

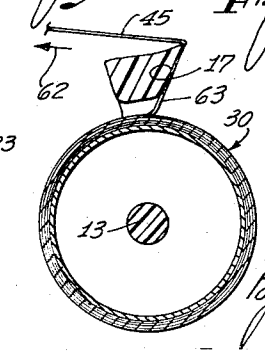
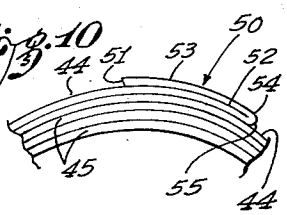


Fig. 9

Fig. 10



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COMBINED LINT REMOVER AND FABRIC COMBER

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8 Claims. (Cl. 15—105)

This invention relates to devices for removing lint, dust and the like from fabric surfaces such as clothing, of the type utilizing a roller having an adhesive peripheral face to which the lint and dust etc. will adhere as the device is rolled over the fabric surface. The invention relates particularly to such a device where the roller is composed of a length of expendable adhesive, coated tape rolled upon itself in a tubular roll and having a generally cylindrical peripheral surface on which pressure sensitive adhesive coating is exposed to provide the lint gathering surface of the roller, and in which when such surface has become saturated with foreign particles adhering thereto, the length of tape providing the outer surface can be stripped off and severed from the roll leaving fresh adhesive refill surface on the roll.

The invention is particularly concerned with how to combine such a roller with a comb which is capable of loosening dirt or lint on the fabric so that it can easily be gathered by the roller. In accordance with the invention, this comb now is identical with a serrated cutting edge, with the aid of which a peripheral layer of the tape can be severed from the roll after it has become unusable; the cleaning device suggested here, therefore, comprises a fork-shaped holder having a handle and two arms contiguous therewith and having similar directions of extension. One of the arms is a shaft upon which is journalled the roller bearing the roll of adhesive tape, while the other arm is provided with a serrated cutting edge defined by a first surface which extends predominantly peripherally in relation to the tubular roll while the other surface forming the edge has a predominantly radial extension. The angle of the cutting edge thereby defined, therefore, is less than 90° and should be larger than 45° which is sufficient to provide for cutting action of the tape, while not being sharp enough to damage fabric when used as a comb. In addition, the cutting edge itself is spaced apart from the circumferential surface of the adhesive paper on the roll in radial direction and for a distance of which permits formation of an end tab which in turn facilitates the loosening of the end of the tape for removing the soiled portion.

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention, it is believed that the invention, the objects and features of the invention and further objects, features and advantages thereof will be better understood from the following description taken in connection with the accompanying drawing in which:

FIGURE 1 illustrates somewhat from the top a side elevation of the holder for a lint remover in accordance with the present invention;

FIGURE 2 illustrates a cross sectional view through the roller and the shaft journalling the roller when placed in position;

FIGURE 3 illustrates a cross sectional view through the two arms of the holder as well as through roller as journalled on one of the arms;

FIGURE 4 illustrates a top view of the inventive lint remover;

FIGURE 5 illustrates a perspective view of an enlarged portion of the cutting edge formed on one of the arms of the holder illustrated in FIGURES 1 and 4;

FIGURE 6 illustrates a cross sectional view of the handle of the holder illustrated in FIGURES 1 and 4;

FIGURE 7 illustrates in perspective view the lint remover in accordance with the present invention during removal of a soiled tape portion;

FIGURE 8 illustrates in cross sectional view the relative position of the tape and of the cutting edge at instant prior to tearing the soiled portion of the roll;

FIGURE 9 is similar to FIGURE 8 and illustrates the formation of the tab subsequent to the tearing; and

FIGURE 10 illustrates an enlarged end view of a portion of the tape roll and the tab as formed.

Proceeding now to the detailed description of the drawing, the device illustrated comprises, in general, a fork-shaped holder 10 having a handle 11 integral with two prongs or arms 12 and 13, which extend colinearly with and from handle 11. The handle 11 has a somewhat T-shaped cross section with rounded lateral surfaces for a smooth changeover from the cross bar to the stem of the T, as can be seen best from FIGURE 6.

The prong or arm 13, has a circular cross section and constitutes a shaft. Shaft 13 has, of course, a central axis and defines radial, axial and peripheral directions in relation thereto. Arm 12 and shaft 13 are about equally long. The shaft 13 ends in a head 23 which has a rounded surface and has a diameter somewhat larger than the diameter of the shaft 13, to form an annular retainer shoulder.

An adjoining bridge 24 for the two arms 12 and 13 merges with the handle 11 and extends somewhat perpendicular thereto. There is thus provided a space 26 in between the two arms which space serves as an accommodation for a roller 30. The roller 30 is comprised primarily of a cylindrical tube 31 made, for example of cardboard, plastic or the like. The two open ends of the tube 31 are closed by means of two disks 32 and 34 each having a somewhat frusto-conical rim respectively adjoining radially extending flanges 36 and 38 to receive and to position the tube 31. Preferably the two disks 32 are clamped onto the end rims of the tube 31 so as to form a disassembleable roller 30. Each one of the disks has a central aperture, there being a first aperture 35 in disk 32 which provides for sufficient clearance for the shaft 13 so that the disk 32 is actually journalled on the shaft 13 permitting free rotation thereon. However, the aperture 35 has a diameter that is smaller than the diameter of the head 23.

The disk 32 is preferably made of a pliable plastic material which makes it possible to squeeze the head 23 through the aperture 35 in either direction, as indicated by arrow 41. Thus, by applying sufficient force in either one of the directions of arrow 41 it is possible to push the head 23 with the shaft 13 into the position illustrated in FIGURE 2, or to remove the disk 32 from the shaft 13. On the other hand during normal use of the device the shoulder of head 23 may engage the outer surface of the disk 32 to serve as a retaining stopper for the entire roller and to prevent shaft 13 from leaving the aperture 35.

The disk 34 has a somewhat wider aperture 37, which is preferably wide enough to permit clearance of the head 23 upon passage therethrough, but this is not essential. It is essential, however, that the aperture 37 is wide enough to accommodate the shaft 13. It can be seen further that the two apertures 35 and 37 are not only located centrally with respect to the disks to which they pertain, but they are coaxial to each other and with the axis of shaft 13. As the cylindrical tube 31 is attached to the disks, the roller 30 thus composed of elements 31, 32 and 33 can be journalled coaxially on the shaft 13.

One can see further that the radius of the tube **31** is smaller than the space **26** between the two arms **12** and **13**, so that the roller clears arm **13**. The portion of the shaft **13** which merges into the bridge **24** may have a widened portion **42** so that the roller **30** as established by tube **31** and disks **32** and **34** can move in axial direction (i.e. in the directions of arrow **41**) only to a very limited degree. Thus, axial movement by the roller **30** is impeded in one direction by the head **23** and in the other direction by the shaft widening **42**.

The tube **31** bears a roll of adhesive tape **45** wound spirally on the tube **31** in the manner which exposes a pressure sensitive adhesive coating **44** on the tape **45**. In the usual manner the tape **45** will basically comprise a web, paper or the like, i.e., it is made of a material having sufficient tear strength, and this tape has only one face covered with the coating of an adherent, pressure sensitive adhesive material which provides the peripheral operating surface of the roller. This roll of tape is wrapped around the thin-walled tube **31** in a plurality of spiral turns, and each underlying turn being adapted to be exposed for service upon stripping off and detaching the peripheral turn that has become more or less saturated with the accumulation of foreign particles.

The arm **12** forms a direct extension of the cross bar portion of the handle **11**. Arm **12** has somewhat concaved but almost flat surface **14**. The surface **17** is contiguous with the top surface of the "T" as defined by the T-shaped cross sectional profile of the handle **11**. The arm **12** itself has a cross sectional profile which can be seen best from FIGURE 3. The other axially extending surface of arm **12** is convexly curved to face the prong or arm **13**. Together, the two bounding surfaces **14** and **15** of the arm **12** form two edges **16** and **20**. One edge, **16**, is rather smooth and is a contiguous extension of one end of the T-shaped cross profile of the handle **11** (see FIGURE 6). The other edge of arm **12** is serrated to form a toothed combing and cutting edge **20**. The edge **20** is specifically formed at and along the intersection of surface **14** and flat surface portion **17** contiguous with and pertaining to surface **15**. This serrated edge is defined by zig-zag profiles **22***a* and **22***b* in the planes of surfaces **14** as well as **17**; in short the teeth have a pyramid like configuration forming a row of apex points **21**.

Since the grooves between adjoining teeth are parallel to each other and are inclined to the surfaces **14** and **17**, the teeth extend from the arm in directions which define a plane that is oriented somewhat, preferably about half way, in between a radial, outward direction and a peripheral direction, both directions taken in relation to the axis of shaft **13**. The cutting edges **22***a* and **22***b* are somewhat symmetrical in relation to the extension of this plane.

Consider a central plane **19** which traverses the axis of shaft **13** and the center of arm **12**, consider further that the surface **17** is about in a plane which has a predominantly radial, outward extension in relation to shaft **13**, then one can see from FIG. 13, (a) that cutting edge **20** is formed at the intersection of the latter plane, and of the plane at surface **14**, and (b) that the cutting edge **20** is rather blunt (about 45° to 60°) if the surface plane of surface **14** has an angle somewhat below 90° but more than about 45° to the central plane **19**.

For normal operation, the user grips the handle **11**, and upon performing a wiping motion he rolls the roller **30** with the exposed adhesive surface **44** of the paper **45** over clothes or other fabric surfaces which have to be cleaned. One of the functions of the serrated edge **20** here is to serve also as a comb. It can be seen that the lint remover can be held by handle **11**, so that the edge **20** as well as roller **30** engages the surface that is to be cleaned.

If, for example, line **46** in FIGURE 3 defines the surface plane of the material to be cleaned, and if the cleaning device **10** is moved by the person using it, in the direction of arrow **47**, one can see that the edge **20** with its teeth operates as a comb loosening the lint fuzz, strands and matting on high-nap material, such as blankets, sweaters, etc., while the roller **30** trails behind this comb and can selectively, i.e. at will, be brought into engagement with this fabric surface **46** to now more easily pick up the loosened particles. Upon rolling back and forth, a very efficient combing and lint removing action is attained.

The second function of edge **20** will be explained next. FIGURE 10 illustrates a sector of a cross section through the roll of paper **45** on an enlarged scale with over-accentuated thickness of the paper. The paper **45** is spirally wound on the tube **31** and, as stated, the adhesive coating **44** extends in outward direction for direct exposure of a single peripheral layer for the purpose of entering into lint removing contact with the surface to be cleaned. This, however, is subject to a slight modification. The end **51** of the tape as it extends axially along the surface on top of the roll is folded back, so that for the length of the fold, two adhesive coating portions face each other to form a tab **50**. These portions are brought into immediate engagement thereby forming a bond which can hardly be loosened. Thereby, then, a strip **53** of uncoated paper becomes exposed forming an edge or fold **54**, which is now the actual outer end of the roll of paper.

This fold **54** has a rounded, approximately cylindrical surface defining beneath it a slight crevice **55** into which the fingernail can be inserted. Thus, the fold **54** defines the tab **50** now having twice the thickness of the tape, which fold cannot be torn crosswise, i.e. in peripheral direction, when pried against by the fingernail of the person trying to loosen the tab **50**. Thus, it becomes relatively easy, as compared to the lifting of a raw edge without such tab, to pry the end of the tape away from the underlying adhesive surface **44** of the roll.

The folded over strip of this tab **50** will reinforce the overall end of the tape against any possibility of its being split lengthwise as it is being pried loose from the roll. As the outer face **53** of the tab **50** is a continuation of the back surface of the tape without adhesive coating, it will not apply adhesive force to the fingertips during the prying operation period.

If after extensive use of the roller the top peripheral layer of roll **45**, with coating **44** exposed, is more or less saturated with lint, dust, etc., it will be necessary to tear this tape portion off as it will cease to operate as a lint removing surface. To this end the user will pry with his fingernail into the crevice **55** to tear loose the tab **50**. When the tab end of the tape has been disengaged from the roll, it can be grasped firmly between the fingers, and pull is applied to the tape to strip the outer turn thereof free from the roll. The tab **50** reinforces the end of the tape transmitting the pull throughout its width and avoiding splitting or tearing off a section of the tape while this pull is being applied.

The user, now, with one hand holds the handle **11** and with the other hand pulls the tape in the radial direction **57** as illustrated in FIGURE 7. As force is applied in the direction of arrow **57** torque is applied to the roller **30** to force the roller **30** to roll in the direction **58** and to unwind a portion of the tape **45** which will be substantially the portion which was saturated with lint. He should avoid that the still somewhat sticky surface of the tape portion presently pulled off does not stick to the surface **17** of arm **12**, as this would impede the unwinding. Prior to this rolling operation it is, however, possible to double back the tab **50** of the tape to further reinforce the tab. This can be done several times so that the final tab is several layers of paper thick.

It will be appreciated that along edge **54** prior to loosening of the tape, a border existed between soiled tape and clean tape. As the tape is now unwound, this border line **59** rotates. Pulling of the tape and unwinding

is stopped when the line **59** has the position illustrated in FIG. 7. In this position the paper **45** is folded over the edge **20** and into engagement with surface **17** of arm **12**, but not into engagement with surface **14** thereof. This is illustrated in FIGURE 8. The cutting edge **20**, particularly the peaks **21** thereof, engages the groove of the folded over portion of the tape **45**.

The user will now apply force in an axial direction, which is perpendicular to the plane of the FIGURE 8, in conjunction with a continuation of a pulling force applied now in the direction **62**. Strong tension will be applied to the paper **45** for engaging directly the cutting edge so as to force the points or peaks **21** to traverse the tape. This pointwise distributed force will insure a clean severance of the paper **45** to progress along the cutting edge **20** in axial direction. Most of the peripheral surface of the roll now exposed is clean, but there still is the soiled portion **61** between line **59** and the line from which portion **63** forming a flap and being also soiled, extends upwardly and sticks to surface **17**. The tape has been sheared off previously along edge **20**. Arm **12** is now pivoted in direction **65** and thereby flap **63** detaches itself from surface **17**. Flap **63** will then be folded gack on top of portion **61**, as is illustrated in FIGURE 9, to form the next tab.

The size of the tab measured in circumferential direction is, of course, the distance of the cutting edge **20** from the periphery of the roll. This distance is sufficient to provide a strong tab without unduly wasting any material. Of course it is apparent that the degree of saturation with line is not so great that coating **44** has no adhesive force whatever. Thus the soiled portion **61** which was not removed and flap **63** are folded against each other, and they still will form a sufficiently strong bond for the purpose of providing the tab needed to unroll the next peripheral tape portion after use thereof.

The invention is not limited to the embodiment described above but all changes and modifications thereof not constituting departures from the spirit and scope of the invention are intended to be covered by the following claims:

1. A device for removing foreign particles of lint, dust or the like from fabric surfaces, comprising:

a fork-shaped holder, having a handle and first and second arms extending from the handle in the same direction as the extension of the handle, said first arm providing a shaft;

a cylindrical roller on said shaft bearing a roll of tape having an exposed adhesive peripheral surface, being juxtaposed to and clearing said second arm, said second arm being rounded along the side facing the first arm and substantially flat at the respective opposite side, there being two edges extending substantially for the length of the second arm, one of said edges defining a serrated cutting edge having teeth extending peripherally as well as outwardly radially in relation to said roller.

2. A device for removing foreign particles of lint, dust or the like from fabric surfaces, comprising:

a fork-shaped holder having a handle and first and second parallel arms extending from the handle in the same direction as the extension of the handle, said first arm providing for a shaft permitting journalling of a roll; and

a cylindrical roller journalled on said shaft for free rotation thereon and bearing a roll of adhesive tape with an exposed adhesive surface, and defining radial, axial and tangential directions, said second arm providing a serrated combing and cutting edge having teeth, the extension of said edge being defined by intersecting axially extending surfaces of said second arm, one of said surfaces extending predominantly radially in relation to said roller, the other one of said surfaces extending predominantly peripherally so that the teeth of said cutting edge extend tangentially and radially outwardly in relation to said roller.

3. A surface cleaning device, comprising:

a fork-shaped holder having a handle and two straight arms extending like prongs from the handle, a first one of said arms constituting a comb having pointed, pyramid-shaped projections, the second one of said arms constituting a shaft and including retaining means for limiting axial movement of a roller when journalled on the shaft, and a roller comprising a roll of adhesive tape, on said shaft, said adhesive tape being wound on said roller to expose peripherally the adhesive material of the outer tape layer.

4. A fork-shaped fabric cleaner holder having a handle and two straight arms extending like prongs from the handle and in generally the same direction, a first one of said arms constituting a comb having pointed, pyramid-shaped projections, the second one of said arms constituting a shaft and including retaining means for limiting axial movement of a roller when journalled on the shaft.

5. A surface cleaning device comprising:

a fork-shaped holder having a handle and two straight arms extending like prongs from the handle,

a first one of said arms constituting a shaft,

a roll of adhesive tape journalled on said shaft, the adhesive side of said tape being peripherally exposed at the top layer of the tape roll, the second arm extending axially along said roll and having a row of pyramid-shaped projections forming a comb and extending radially outwardly and peripherally in relation to said roll.

6. A surface cleaning device comprising:

a fork-shaped holder having a handle and two straight arms extending in parallel from said handle and in generally the same direction, a first one of said arms constituting a shaft, a roller having an adhesive peripheral surface journalled on said shaft, a second one of said arms having a fabric comb edge extending in direction so that a fabric surface when engaging said adhesive periphery of said roller can be brought into engagement with said comb at a steep angle.

7. A surface cleaning device comprising:

a fork-shaped holder having a handle and two straight arms extending like prongs from the handle and in generally the same direction,

a first one of said arms constituting a shaft,

a roll of adhesive tape journalled on said shaft, the adhesive side of said tape being peripherally exposed at the top layer of the tape roll, the second arm extending axially along said roll and having a serrated edge forming a cutting and combing edge and extending radially outward and peripherally in relation to said roll, there being a surface of said second arm adjacent to said edge extending substantially radial as temporary engaging surface for the tape end, after a portion of the tape has been torn off along said edge.

8. A surface cleaning device comprising:

a fork-shaped holder having a handle and two straight arms extending like prongs from the handle and in generally the same direction,

a first one of said arms constituting a shaft,

a roll of adhesive tape journalled on said shaft, the adhesive side of said tape being peripherally exposed at the top layer of the tape roll, the second arm extending axially along said roll and having a cutting edge and an axially extending surface portion adjoining the edge and extending substantially radial in relation to the roll to permit temporary engagement of a tape end portion after a portion of the tape has been torn off along said edge.

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DANIEL BLUM, *Primary Examiner.*