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2,637,956

COATED ABRASIVE BELT

Filed March 28, 1952

FIG. 1

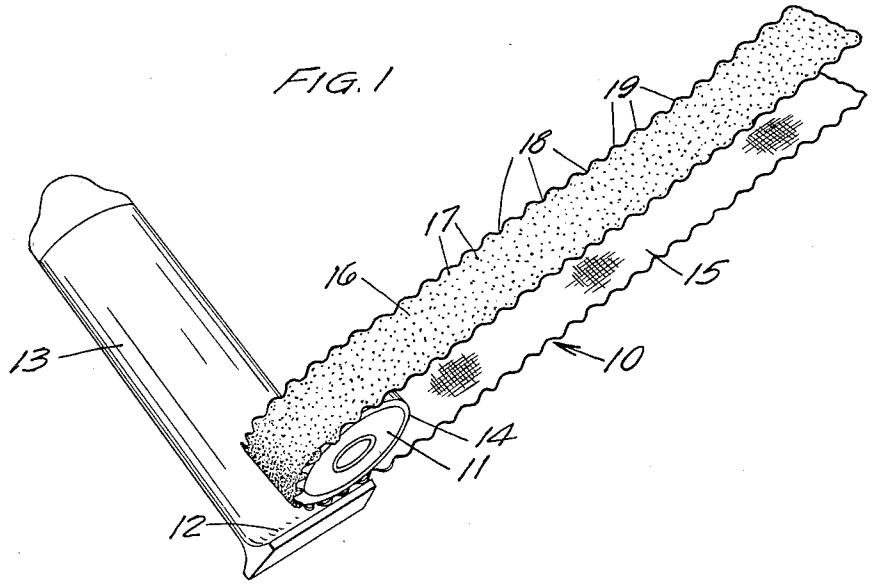


FIG. 2

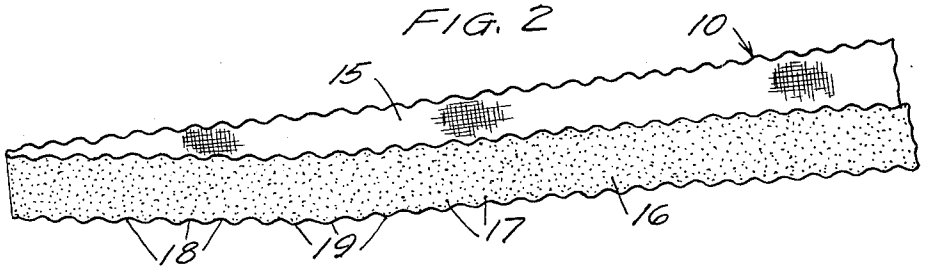


FIG. 3

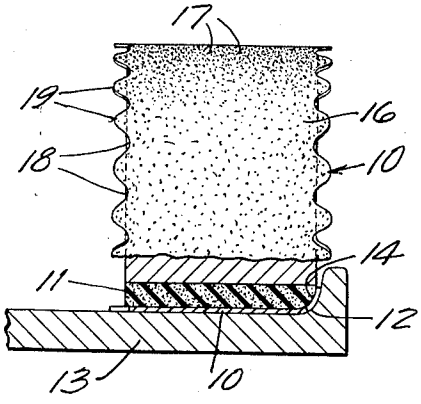
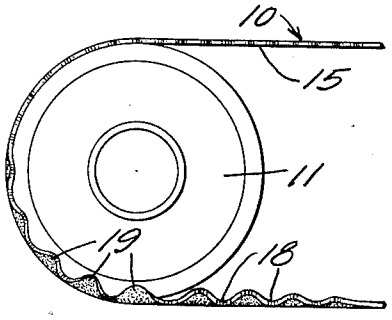


FIG. 4



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COATED ABRASIVE BELT

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3 Claims. (Cl. 51—188)

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This invention relates to coated abrasive articles, and, more particularly, to such articles in the form of an endless belt.

The use of coated abrasive belts has been extended markedly in recent years, partially through the development of improved grinding devices which include a contact roll for resiliently, yet firmly, supporting the abrasive belt against the workpiece while the former is moving at high speeds. Such uses of abrasive belts have quite largely been confined to abrading substantially flat surfaces, such as steel sheets, flat glass, glass edges, and the like.

An object of this invention is the provision of a coated abrasive belt that may be employed not only to abrade and polish flat surfaces but also may be supported upon a contact roll or platen to abrade and polish curved surfaces of small radii, such as, for example, the recessed areas of cutlery, trigger guards, and the fillets of jet blades, where the edge of the conventional abrasive belt would undercut or rapidly become frayed.

Coated abrasive belts known to the art are provided with straight edges. I have found that a workpiece having a curved surface of a small radius may be abraded or polished in a highly satisfactory manner by the use of coated abrasive belts having scalloped or "pinked" edges, as hereinafter set forth. A further advantage of my improved belt lies in the fact that the same belt may be employed in grinding both flat and curved surfaces, and thus it is not necessary to change the belt used in grinding the foil surface of a jet blade when it is desired to abrade the curved root section of the blade.

The invention will be readily understood from the following description in connection with the accompanying drawing, in which:

Figure 1 is a perspective view of a portion of the improved abrasive belt mounted upon a contact roll, forming a part of a grinding device (not shown) and in position to abrade the curved root section of a jet blade as the workpiece;

Figure 2, a plan view or a portion of my improved coated abrasive belt;

Figure 3, an enlarged front elevational view, partly in section, of the elements shown in Figure 1;

Figure 4, an enlarged side elevation of my improved belt mounted upon a contact roll, with the workpiece removed.

Referring to the drawing, in Figures 1 and 3, my improved abrasive belt 10 is shown mounted upon a contact or presser roll 11 in position to

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abrade the curved fillet 12 of a jet blade 13. The contact roll is preferably provided with sloping or tapered peripheral edges 14, and is otherwise of conventional construction. It has a somewhat resilient surface to afford a firm, yet yielding, support for the abrasive belt when the latter is engaged with the workpiece. The contact roll 11 may be of the type disclosed in Herchenrider Patent No. 2,145,418 of January 31, 1939. The contact roll 11 is one element of a conventional grinding device (not shown) of the type in which a flexible abrasive belt is trained over a contact roll and a driven roll and on which the belt may be driven at high speeds. Grinding and polishing devices of the general type disclosed in the above-mentioned Herchenrider patent are suitable for use with my improved abrasive belt. The belt may also be employed with a permanent shaped back-up support, such as a formed platen.

The belt 10 comprises a flexible backing 15 coated upon one surface with an adhesive binder 16 and carrying a layer 17 of abrasive particles embedded in the binder. The backing may be formed of cloth, such as stretched, pre-shrunk drill cloth, vulcanized fiber, paper, combinations of cloth, fiber or paper, or similar flexible, dimensionally stable material. The adhesive binder may comprise one or more coatings of glue or of a synthetic resin, such as modified phenolic resins or a drying-oil-modified alkyl resin, for example, of the type disclosed in the Guth Patent No. 2,202,756, or of combinations of glue and resin coatings. The abrasive grits are those previously employed in the coated abrasive industry, such as silicon carbide or aluminum oxide. Endless belts may be made from the coated and cured sheet material by slitting it to the proper width and skiving and splicing together the ends of a strip of the desired length, in accordance with well-known practice.

After the coated web has been cured and slit to strips of the desired width, and preferably before the ends of the strips have been spliced, the coated strips are passed through a "pinking" device to cut out, in one or both edges of the strips, suitably shaped indentations 18, regularly spaced between intervening ridges 19. The size and spacing of the indentations 18 may vary in different belts, depending upon such variables as the width of the belt, the diameter of the contact roll upon which the belt is to be mounted, the shape and radius of curvature of the workpiece and the speed of belt travel. At higher speeds a belt having fewer indentations for a

given length can be satisfactorily employed than when the belt is driven at slower speeds. It is particularly important that the ridges or scallops 19 are of such shape and size that they will not overlap each other when bent over at angles approaching 90° when engaged with the work. Otherwise the workpiece may be marred or abraded irregularly. The curved fillets of jet blades, as shown in the drawing, have been satisfactorily abraded with a belt ⅞ of an inch in width (from crest to crest) and mounted on a contact roll of 2½ inches in diameter. This belt was provided with four indentations, of a depth of approximately $\frac{3}{16}$ of an inch, per linear inch. The distance between adjacent lands was approximately ¼ of an inch, and, as shown, the shape of the ridge 19 and intervening valleys or indentations 18 approximated the curve of a sine wave. On a wider belt to be used on a larger contact roll, the indentations would preferably be deeper than $\frac{3}{16}$ of an inch. Likewise, the shape of the indentations and intervening ridges may be modified and they may be approximately square or oblong, or may be saw-toothed in shape.

As shown in Figures 1, 3 and 4, as the improved belt passes over the contact roll and bears against the workpiece, the lands or ridges 19 coated with abrasive particles are bent from the plane of the central portion of the belt and conform to the curvature of the work. As indicated in the drawing, it is essential that the ridges be so shaped and spaced that they do not overlap each other when bent against the curved workpiece. If both edges of the belt are scalloped, a ridge 19 on one edge is preferably disposed opposite to a valley 18 on the other edge.

While the invention is preferably employed in abrasive articles, in the form of coated abrasive belts, it is apparent that my improved abrasive material has utility in the form of discs, flat sheets or strips, etc.

Having described various embodiments of my invention for purposes of illustration, but without intent to be limited thereto, what I claim is as follows:

1. A flexible abrasive belt suitable for the abrading of curved surfaces comprising a flexible, dimensionally stable backing, an adhesive coating on one surface of said backing, and a multiplicity of abrasive particles embedded in said adhesive coating, at least one edge of said belt being provided with a series of evenly shaped and spaced indentations, the intervening ridges being coated on one surface thereof with abrasive particles and being spaced in such manner that they do not overlap each other when bent to the work.

2. A coated abrasive belt suitable for the abrading of curved surfaces comprising a water-resistant, dimensionally stable backing, an adhesive binder coated on one surface of said backing and a multiplicity of abrasive particles embedded in said binder, at least one edge of said belt being scalloped to provide indentations and intervening lands, the edges of said lands and indentations forming a curve of the nature of a sine wave, the lands being coated on one surface thereof with abrasive particles.

3. A coated abrasive belt comprising a flexible, water-resistant, dimensionally stable backing, an adhesive coating on one surface of said backing, and abrasive particles embedded in said adhesive coating, both edges of said belt being provided with regularly spaced and shaped indentations, the ridges intervening said indentations being coated on one surface thereof with abrasive particles and the ridges on one edge of said belt being disposed opposite to the valleys on the other edge of said belt.

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No references cited.