Dec. 28, 1965 H. M. FIELD ETAL 3,225,916

ASSEMBLAGE OF ABRASIVE ELEMENTS

Filed Jan. 9, 1963

Fig. 1

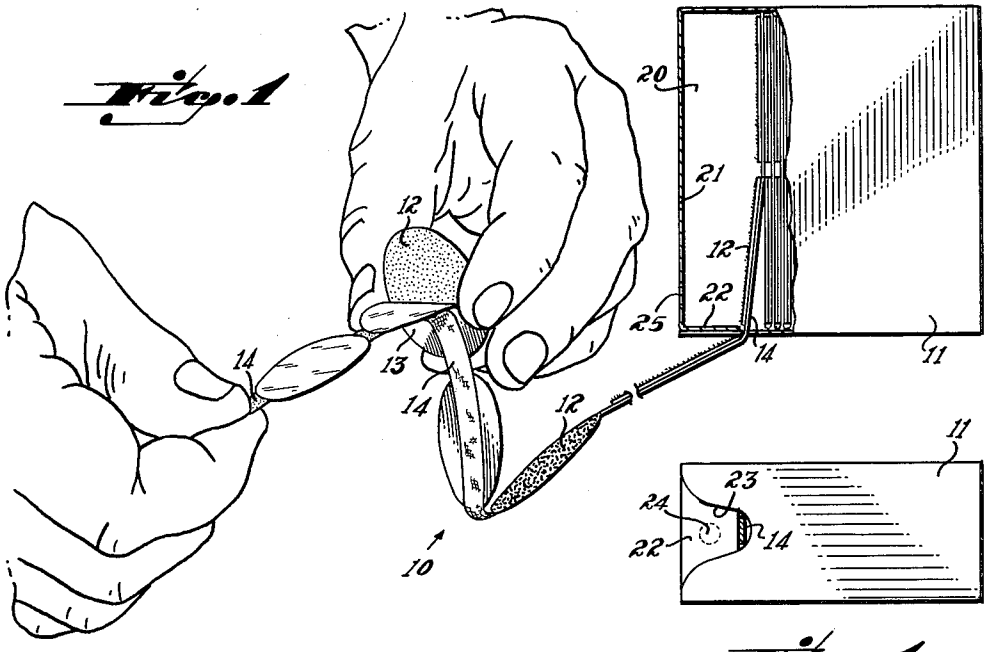

Fig. 4

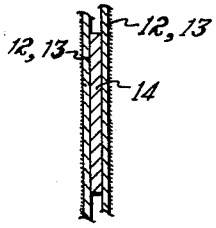

Fig. 6

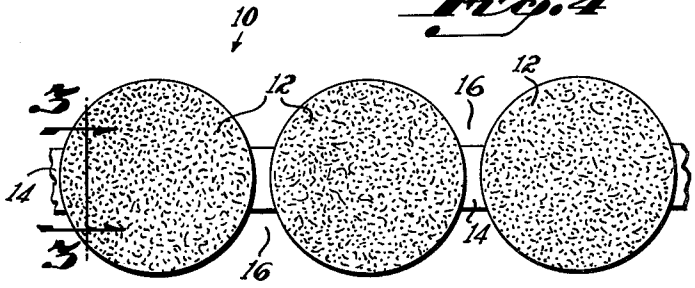

Fig. 2

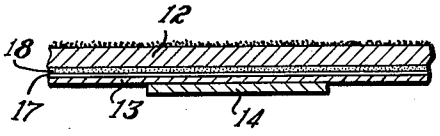

Fig. 3

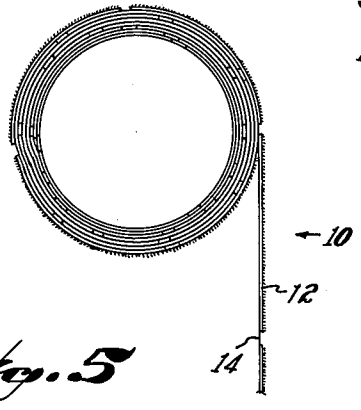

Fig. 5

INVENTOR.
Henry M. Field
BY Billy A. Anderegg
Wood, Herron & Evans
ATTORNEYS

United States Patent Office 3,225,916
Patented Dec. 28, 1965

3,225,916

ASSEMBLAGE OF ABRASIVE ELEMENTS

Henry M. Field and Billy A. Anderegg, Dayton, Ohio, assignors to Dayton Abrasive Products, Inc., Dayton, Ohio, a corporation

Filed Jan. 9, 1963, Ser. No. 250,282
3 Claims. (Cl. 206—56)

This invention relates to abrasive sheets and more particularly to abrasive discs adapted to be adhesively secured to grinding and sanding tools. The discs which are the subject of the invention may be used in many finishing or polishing operations performed on metal or wood workpieces. The sizes of the discs, too, may vary widely depending on the type and size of tool to which they are applied.

For the purpose of illustrating the invention the description will be directed to discs which are applied to the surface of a rotatable holder mounted in the chuck of a hand drill. Each disc has an abrasive coating on one surface and a pressure sensitive adhesive on the other surface. The disc is applied to the holder by pressing its adhesive side onto the surface of the holder. When a disc must be replaced, either because it is worn or because a different grit size abrasive is required, the disc is simply peeled away from the holder. The holder which may be metal, rubber or the like, presents a surface which is markedly less adherent to the adhesive than the surface of the disc so that in peeling away from the holder, the disc carries the adhesive with it and leaves a clean holder surface ready for the next disc.

The objective of the present invention has been to provide a conveniently usable package of such abrasive discs which protects the adhesive on the discs prior to usage. To this end we form a belt of discs interconnected by a ribbon, or tape, and we provide for attaching the discs to the ribbon in such a manner as to permit their easy removal and even return to the ribbon.

In the preferred form of the invention each abrasive disc is secured to a backing disc having a surface which is considerably less adherent to the adhesive than is the abrasive disc. A plurality of such backing discs, in turn, are secured in spaced relation to an adhesive surface on the ribbon. The thus formed belt of discs may be rolled or preferably may be accordion folded, that is, zig-zag folded in a box.

The invention as described has a number of advantages. Since the discs are used in an environment which necessarily creates an atmosphere of dust and small particles, it is desirable to avoid the exposure of the adhesive on the disc to that atmosphere. The backing disc provides such a protection so that each disc as it is peeled from its backing strip has a coating of virgin adhesive ready for application to the holder.

The adhesive ribbon adheres to the backing disc more tightly than the backing disc adheres to the abrasive disc so that when the ribbon is pulled with respect to the abrasive disc, it pulls or peels the backing disc away from the abrasive disc. The ribbon therefore provides a "handle" or tab by which the backing disc can be peeled away from the abrasive disc at such time as the abrasive disc is to be used. Further, the belt-like assemblage of individual discs provides assurance that the discs will be removed from the assemblage one at a time with those discs not in use remaining in a container free from dust.

The invention also admits another possibility resulting in a saving. From time to time in the polishing or grinding operation, it is necessary to change from one type of disc to another, for example from a coarse grit to a fine grit disc. If the coarse grit disc has only been partially used, it can be removed from the holder and replaced on

the belt to remain in a protected condition while the other disc is being used. Thus, there is no waste of partially used discs.

It has been another objective of the invention to provide an assemblage of abrasive discs which can be easily manufactured and further to provide a combination of such an assemblage and a carton by which the discs may be easily dispensed.

These and other objectives of the invention will become more readily apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view showing the invention.

FIG. 2 is a top plan view of a section of belt formed in accordance with the invention,

FIG. 3 is a cross sectional view taken along lines 3—3 of FIG. 2,

FIG. 4 is an end elevational view of a container for the discs,

FIG. 5 is a side elevational view of a roll of discs, and

FIG. 6 is a cross sectional view of an alternative form of the invention.

Referring to the sheet of drawings, a belt of discs is indicated at **10** and is shown stored in a cardboard carton **11** by accordion folding the discs so as to permit their easy removal. The principal elements which form the belt are the discs **12**, backing discs or sheets **13** and an elongated interconnecting ribbon **14**. The ribbon preferably is formed by masking tape, although any other suitable tape can be used so long as it is provided with an adhesive on the surface to which the backing discs **13** are applied.

The backing discs are preferably paper elements whose opposite surfaces have a disparate adherence to adhesives. In other words, that surface which is in contact with the ribbon **14** is the natural fibrous surface of paper which adheres tightly to an adhesive. The opposite surface which is in contact with the abrasive disc has a coating of wax or other substance providing a weakened bond which results in a comparatively non-adhering surface. The surface is, however, sufficiently adherent to assure its remaining on the abrasive disc against accidental removal.

The abrasive disc is usually formed of a cloth or fabric, one surface of which is coated with the abrasive. The other surface has an adhesive applied to it, the adhesive remaining firmly adhered to the fibrous cloth material. The abrasive discs and backing discs are pressed onto the adhesive surface of the ribbon **14** and preferably are spaced from each other a short distance indicated at **16**. That distance should be slightly greater than the double thickness of abrasive discs and backing discs in order to provide a sufficient length of the ribbon to permit the accordion folding of the belt of discs as illustrated in FIG. 1.

The relationship of the elements is illustrated in FIG. 3. The ribbon has at least one adhesive surface which is in engagement with the natural surface of the paper backing disc **13**. A coating **17** is applied to the opposite surface of the backing disc to render that surface considerably less adherent to the adhesive than either its opposite surface or the surface of the abrasive disc. An adhesive **18** is sandwiched between the non-adherent coating **17** and the reverse surface of the abrasive disc to removably secure the abrasive disc to the backing disc.

The manner in which the backing discs are removed is illustrated in FIG. 1. The abrasive disc **12** with its adhering backing disc **13** is held in one hand and the ribbon **14** is held in the other hand. A slight pull on the ribbon peels the backing disc away from the abrasive disc. The peeling is easily effected because of the disparate adherence of the two facing surfaces of the backing disc

and abrasive disc respectively. The adhesive **18** is highly adherent to the back side of the abrasive disc **12** but the coating **17** of the backing disc **13** has only sufficient adherence to maintain the backing disc in engagement with the abrasive disc while the elements are stored. Further, since the adhesive surface of the ribbon is in engagement with the natural fibers of the paper backing disc, it remains adhered to the backing disc so as to pull the backing disc with it during the peeling operation.

The invention thus far described is a combination of three main elements, namely the ribbon, the backing disc and the abrasive disc. It should be understood that the backing disc and ribbon could be formed as a single element, that is a wide ribbon whose width is the same as the diameter of the abrasive disc. The ribbon should have one surface having the same quality of only slight adherence as has the coated surface of the backing disc. Many of the attributes of the three element combination (abrasive disc, backing disc and ribbon) apply equally to such a two element combination (abrasive disc and ribbon). However, the wide ribbon adds considerably to the weight of a belt of discs and further is not as easily assembled, folded and dispensed as the three element combination.

To package a belt of discs we have provided the carton **11** shown in FIGS. 1 and 4. The carton is a generally rectangular paperboard carton providing a receptacle **20** which can be enclosed by a flap **21** having a front tab **22**. The front surface of the carton illustrated in FIG. 4 has an elongated slot **23** which is somewhat wider than the width of the ribbon **14**. The slot is normally covered by the tab **22** on the flap **21** when the flap is placed over the top of the carton to close the carton. However, in either open or closed condition, the spent ribbon can pass through the slot **23** and does not effect the opening or closing of the lid **21**. In passing through the slot and projecting beyond the carton walls, the spent portion of the ribbon provides a convenient handle by which to pull out the discs lying in the bottom of the carton.

The tab **22** has an outlined circle **24** perforated for easy removal. Flap **21** has an identical outlined, perforated circle **25** for easy removal. After removal, tab **22** may be folded against flap **21** which brings both holes into alignment. With flap **21** in open position and tab **22** folded against flap **21**, the container may be hung on wall or table.

While it is preferred to store the discs in a carton of the type illustrated, it should be understood that the belt of discs can be in the form of a roll such as is illustrated in FIG. 5. The container for such a roll, however, would be more expensive than the rectangular carton described above and, additionally, is somewhat bulkier.

It should also be understood that the invention is not restricted to the placing of discs on one side only of the ribbon **14**. If both sides of the ribbon are provided with a pressure sensitive adhesive, both sides of the ribbon would therefore be adapted to receive abrasive discs so that a belt could be formed as illustrated in FIG. 6.

There are several methods by which the belt of the present invention can be manufactured. However, it is preferred to perform the manufacturing operation as follows: first, an adhesive is applied uniformly to the coated surface of a backing sheet of such dimensions as to permit a plurality of individual discs to be cut from it. A cloth sheet coated on one surface with abrasive material is placed with the uncoated surface on the adhesive of the backing sheet, and the sheets are pressed together with uniform pressure as by passing them through rolls. Obviously, the adhesive could be applied first to the abrasive sheet, but we have found that a more uniform application of the adhesive to the abrasive discs can be obtained by first applying it to the coated surface of the backing sheet and then transferring it to the abrasive sheet. The transfer takes place because of the abrasive sheet's greater infinity or adherence to the adhesive.

Having formed a sandwich of adhesive between the abrasive and backing sheets, the sheet material is run through a press which cuts the discs. These discs may be from three-eighths inch to nine inches in diameter. Above nine inches, it is not economically feasible to form a belt of discs. The discs are collected and put in a hopper with the paper side down and then dropped from the hopper one at a time in place on the strip of masking tape which forms the ribbon **14**.

The thus formed belt of discs is accordion folded and, in groups of fifty for example, disposed in the carton **11**.

Having described my invention, I claim:

1. A package of abrasive discs comprising,
an elongated ribbon having a series of abrasive discs secured to it, said ribbon having a width substantially less than the width of said disc, said discs being spaced apart a distance greater than the combined thickness of adjacent discs,
a rectangular carton having end walls, side walls, and a bottom wall, said ribbon being accordion folded in said carton, said end walls having a width slightly greater than the width of said disc,
a flap hinged at one end to the edge of one end wall, said flap extending over the top of said carton and terminating in a tab insertable into said carton adjacent the other end wall,
said other end wall having a slot of greater width than said ribbon and extending from the free edge of said wall into a substantial portion of said wall,
the length of said tab being approximately equal to the depth of said slot for engaging said ribbon between said spaced discs.

2. A belt of abrasive elements comprising,
a plurality of backing sheets, each backing sheet having opposite surfaces of disparate adherence to adhesives,
an elongated ribbon having adhesive on at least one surface thereof, said ribbon having a width substantially less than the width of said backing sheet,
a coating providing a weakened bond on said first surface of said backing sheet,
said backing sheets being disposed in longitudinally spaced relationship a distance greater than twice the thickness of the abrasive elements along said ribbon with said second surface in engagement with said adhesive on said ribbon,
a plurality of abrasive sheet elements, each having an abrasive coating on one surface, the other surface having an adhesive thereon and being releasably adhered to the backing sheet, said abrasive sheet elements coextensive with said backing sheets when disposed thereon.

3. A belt of abrasive elements comprising,
a plurality of backing sheets, each backing sheet having a first and second surface of disparate adherence to adhesives,
an elongated ribbon having adhesive on at least one surface thereof, said ribbon having a width substantially less than the width of said backing sheets,
a coating providing a weakened bond on said first surface of said backing sheet,
a plurality of abrasive sheet elements, each having an abrasive coating on one surface, the other surface having an adhesive thereon and being releasably adhered to said coating on said first surface of said backing sheet, and
said backing sheets with said abrasive elements disposed thereon being longitudinally spaced along said ribbon with said second surface being in contact with the adhesive on said ribbon, and spaced apart a distance greater than the combined thickness of the adjacent backing sheets and abrasive sheets, said

abrasive coextensive with said backing sheets when disposed thereon.

References Cited by the Examiner

UNITED STATES PATENTS

2,485,295	10/1949	Larson	206—56
2,732,065	1/1956	Marchese	206—56

2,758,710	8/1956	Arens	206—56
2,831,277	4/1958	Strachan	206—56
2,883,044	4/1959	Kendrick	206—56
3,001,906	9/1961	Capella et al.	206—56

THERON E. CONDON, *Primary Examiner.*

GEORGE O. RALSTON, *Examiner.*