

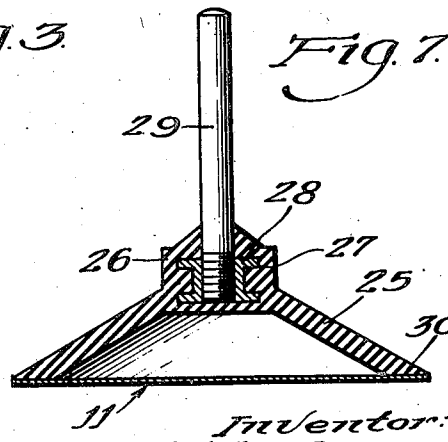
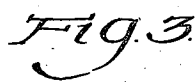
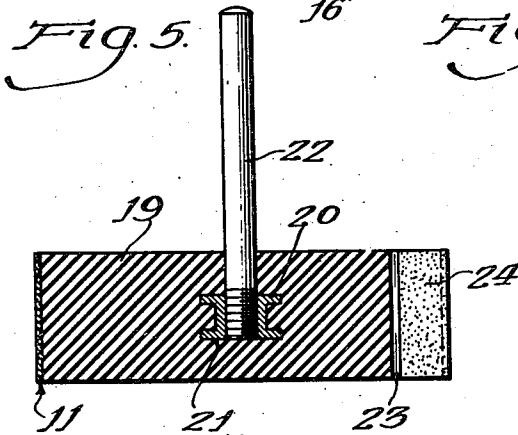
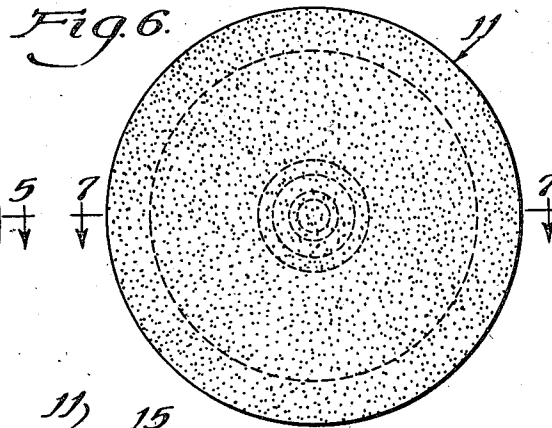
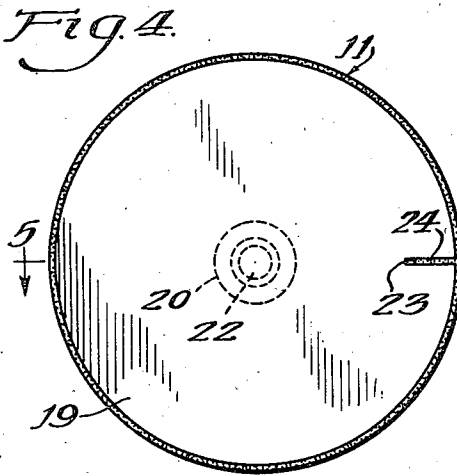
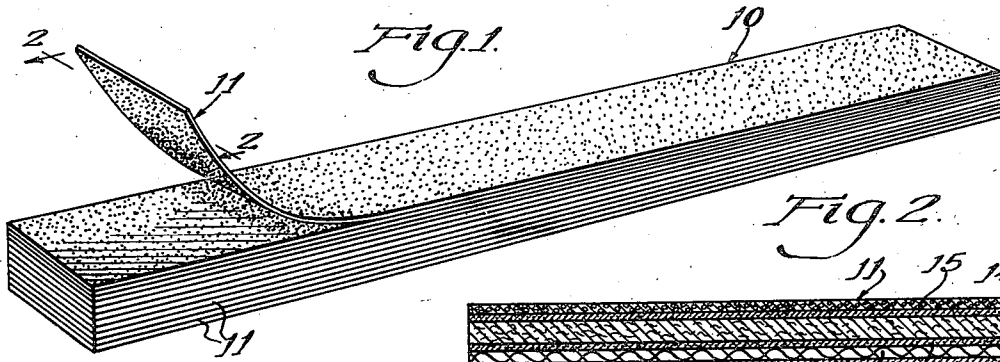
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2,485,295

PACK OF ABRASIVE COATED SHEETS

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UNITED STATES PATENT OFFICE

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PACK OF ABRASIVE COATED SHEETS

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2 Claims. (Cl. 206-56)

1 This invention relates to abrasive coated sheets, of the character commonly known as emery cloths, sandpapers, and the like. More particularly, this invention relates to an abrasive coated paper sheet, and to a pack of such abrasive coated paper sheets, and to holders for use with the new abrasive coated sheets.

In the die maker's art large quantities of abrasive coated paper sheets, such as sandpaper, emery cloth and the like, are used for polishing ridges and other rough surfaces in die mold cavities and the like. To accomplish this result die makers frequently wrap a piece of such abrasive coated paper, such as sandpaper, about a pencil or piece of wood for the purpose of providing a support for forcing the abrasive sheet into and around the hills and valleys in such die mold cavities and the like, during the polishing operation. This practice is difficult and is hard on the operator's hands and fingers, frequently causing them to become scratched and cut.

There is currently available upon the market a device for holding an abrasive coated paper sheet, such as a sheet of sandpaper, upon a cylindrical holder for use in polishing the ridges and other irregular and rough surfaces in die mold cavities and the like. However, this prior holding device is of relatively involved and complicated and correspondingly expensive construction and requires considerable time and effort in mounting an abrasive sheet thereon and in removing it therefrom.

An object of the present invention is to provide an abrasive coated strip or sheet comprised of a carrier or base sheet of paper or the like having a pressure-sensitive adhesive on its bottom or non-abrasive coated surface so that it may be readily formed around and attached to a suitable supporting element for use by die makers in polishing die mold cavities, and for other purposes.

Another object of the invention is to provide a novel pack of abrasive coated paper, or like sheets, adhesively held together in the form of a pack of adhesive engagement or contact between the abrasive coating on the upper surface of each underlying sheet with the pressure sensitive adhesive on the bottom or non-abrasive coated surface of each carrier or base sheet to the end that the abrasive coated paper sheets may be made in suitable sizes or dimensions and sold and distributed as a pack thereof and each sheet readily removed from the pack as and when desired.

An additional object of the present invention is to provide novel holders, hereinafter described, which are especially adapted for use by die mak-

2 ers, and the like, with the new abrasive coated sheets or strips of the present invention.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show preferred embodiments of the invention and the principles thereof and what I now consider to be the best mode in which I have contemplated applying those principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

Fig. 1 is a perspective view of a pack of abrasive coated sheets made in accordance with and embodying the present invention, the uppermost sheet in the pack being partially peeled back at one end thereof to illustrate the manner in which the sheets may be separated from the pack, one by one, when required for use;

Fig. 2 is an enlarged transverse sectional view, on line 2-2 in Fig. 1, illustrating a typical and preferred construction of one of the new abrasive coated sheets;

Fig. 3 is an enlarged transverse sectional view, similar to Fig. 2, but illustrating a modified form of the invention;

Fig. 4 is a top plan view illustrating a holder or support with and upon which the new abrasive coated sheet may be used and which is especially adapted for use by die makers in polishing the surfaces of die mold cavities and the like;

Fig. 5 is a sectional view on line 5-5 in Fig. 4, illustrating the manner in which the new abrasive sheet is mounted in position of use upon the holder illustrated in Fig. 4;

Fig. 6 is a top plan view illustrating another type of holder which may be used for holding the new abrasive sheet, and which is especially adapted for use by die makers in polishing the ridges and other irregular surfaces in die mold cavities and the like; and

Fig. 7 is a transverse sectional view, on line 7-7 in Fig. 6, illustrating the manner in which the abrasive sheet of the present invention is mounted upon the holder shown in Fig. 6.

A pack of abrasive sheets made in accordance with and embodying the present invention is shown in Fig. 1, wherein it is generally indicated at 10, and comprises a plurality of superimposed abrasive coated sheets each of which may em-

body the construction illustrated in Fig. 2, or that which is illustrated in Fig. 3.

It will be noted, by reference to Fig. 2, that each sheet 11 is comprised of a base sheet or carrier 13, of paper or like flexible material, having a film or coating of adhesive 14 thereon. This adhesive film or coating 14 may be of any suitable type used in the art of making sand-paper, emery cloth, and like abrasive coated sheets. Thus for this purpose I may employ a suitable resin or a suitable animal or vegetable glue, over and upon which a layer 15 of finely divided abrasive particles is laid. The abrasive particles 15 may be composed of sand, emery, silicon carbon, or the like.

In the practice of the present invention I apply to the bottom a non-abrasive coated surface of the paper or like base sheet or sheet 13 a coating or film of normally tacky and pressure-sensitive adhesive 16. This coating or film of normally tacky, pressure-sensitive adhesive 16 may be applied directly to the bottom or non-abrasive surface of the paper or like base sheet or carrier, as in Fig. 3, or it may be applied to an auxiliary base sheet or carrier 17, as in the form of the invention illustrated in Figs. 1 and 2. This auxiliary base sheet or carrier 17 may be a thin layer of cotton, such as crinoline, to the inner surface of which a layer or coating 18 of normally tacky, pressure-sensitive adhesive is applied so as to adhesively secure the auxiliary base sheet or carrier 17 to the back of the abrasive coated sheet 13.

The normally tacky, pressure-sensitive adhesive films 16 and 18 may be made according to the disclosure of United States Letters Patent No. 2,206,899 granted July 9, 1940 to Waldo Kelgren on "Method of making pressure-sensitive adhesive sheets." The pressure-sensitive adhesive material 16 or 18 may be of any character suitable for the purposes of the present invention. It may contain a reinforcing pigment capable of penetrating into the paper, and may be colored by a pigment or dye. The following examples illustrate suitable adhesive compositions which may be used in the practice of the present invention, all parts being by weight:

Example No. 1

	Parts by weight
Latex crepe	100
Zinc oxide	100
Rosin	100
Heptane (volatile solvent)	400-600

The latex crepe and zinc oxide are milled on a rubber mill for 10 minutes, at a temperature of about 140-150° F., and the resulting base is cut into small pieces and placed in a suitable churn with the rosin and solvent. The mixture is mixed until homogeneous, involving mixing for about 40 hours.

Example No. 2

	Parts by weight
Latex crepe	132
Zinc oxide	165
Blue pigment mixture	39.5
No. 10 wood rosin	72.5
"Flectol B" (antioxidant)	1.5
Heptane (volatile solvent)	750

The blue pigment mixture is exemplified by "Du Pont rubber blue Y. D," a milled mixture of equal parts latex crepe and dry blue pigment. This pigment may be omitted.

The latex crepe, zinc oxide and pigment are milled for 10 minutes, at a temperature of about 140-150° F., and the resulting base is cut into small pieces and churned with the antioxidant, rosin and solvent for about 40 hours at a temperature of 70-100° F.

The indicated heptane may be substituted for by another volatile rubber solvent such as benzol or naphtha. It will be understood that the proportion of solvent may be varied to produce the desired viscosity of the adhesive solution, which should be sufficiently low to insure thorough saturation of the paper base sheet or carrier 13 and yet high enough to introduce sufficient solids so as to properly unify the paper. The adhesive solution produced according to these examples is a thick viscid liquid. The amount of hydrocarbon solvent required may be reduced by incorporating alcohol as a viscosity-reducer, which may be denatured ethyl alcohol (for example containing 5 volumes of methyl alcohol or ethyl acetate per 100 volumes of 190 proof ethyl alcohol) or may be methyl alcohol, and which may be used in amount equal to 10 to 20% of the hydrocarbon solvent.

The "Flectol B" (a liquid condensation product of acetone and aniline) is used as an antioxidant to improve the rubber aging qualities. Other suitable antioxidants or age-resistors are: "Flectol H" (a solid condensation product of acetone and aniline), "Solux" (p-hydroxy-N-phenylmorpholine), "Agerite Resin" (aldol-alpha-naphthylamine reaction product), "Antox", beta-naphthol, "Agerite Alba" and "Agerite White." Those which are soluble in the rubber solvent may be added directly, otherwise they may be milled into the rubber during the initial milling.

The coloring pigment serves also as a reinforcing pigment, as does the zinc oxide, giving greater cohesiveness (firmness) to the adhesive. These pigments may be omitted or reduced in order to produce transparent adhesive coatings and a transparent or semi-transparent adhesive sheet product. The adhesive impregnant with which the paper is saturated serves to transparentize it.

Example No. 3

Parts by weight

Isobutylene polymer "medium"	200
Isobutylene polymer "low"	200
Soft cumarone resin	80
Heptane	1600

The isobutylene polymers are resinous materials, the one designated "medium" having a molecular weight of about 80,000 and is transparent and "rubbery" in appearance. The one designated "low" has a molecular weight of about 14,000. The ingredients are placed in a churn and mixed until homogeneous.

The cumarone resin acts as a tack-producer, as does the lower isobutylene polymer. The latter may be omitted and the stated proportion of cumarone resin retained or increased, and the cumarone resin may be substituted for by wood rosin or other tack-producing resin.

Example No. 4

Parts by weight

70 Isobutylene polymer "medium"	1
Zinc oxide	0.5
Para-toluidine red	0.2
Wood rosin	0.5
Hydrogenated methyl abietate	0.2
75 Heptane	7

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The isobutylene polymer, zinc oxide and coloring ingredient (illustrated by para-toluidine red) are first milled on a rubber mill until a uniform plastic composition is secured. This plastic mass is then cut into pieces and placed in a suitable churn with the balance of the ingredients and churned until a homogeneous solution is formed. The wood rosin serves as a tack-producing agent, so that normally tacky and pressure-sensitive adhesive coatings will be formed. The hydrogenated methyl abietate serves as a plasticizer and may be omitted.

A suitable holder for using the new abrasive sheet is illustrated in Figs. 4 and 5 of the drawing, and comprises a resilient and substantially cylindrical holder base or body 19 which has a centrally formed cavity 20 formed therein for the reception of an internally threaded anchoring ferrule 21 to which an externally threaded shaft 22 is attached. A radially extending slot 23 is formed in the holder base or body 19, as shown in Fig. 4.

In the use of the new abrasive sheet 11, upon the particular type of holder shown in Figs. 4 and 5, the sheets or strips 11 may be preformed to a size and shape adapted to fit upon the holder base or body 19, and the sheets or strips 11 may be readily peeled or separated from the pack 10. Alternatively, the sheets 11 may be made in relatively larger sizes and peeled from the pack 10 and cut to the proper size and shape to fit upon the holder shown in Figs. 4 and 5 or upon the holder shown in Figs. 6 and 7.

One end portion 24 of the abrasive sheet or strip may then be inserted into, and adhesively secured in, the radially extending slot 23 in the substantially cylindrical holder base or body 19 and the remaining length of the strip or sheet, with the pressure-sensitive adhesive coating 16 disposed inwardly, wound about the substantially cylindrical holder base or body 19 in adhesive contact therewith. The pressure-sensitive adhesive layer 16 will thus cause the entire abrasive coated paper strip or sheet 11 to adhere to the peripheral surface of the holder base or body 19. The thus completed tool, shown in Figs. 4 and 5 may be attached, by means of the shaft 22, to a chuck, or the like, of any suitable portable motor driven tool and the holder 19 with the abrasive sheet 11 adhered thereto rotated in contact with the surface of a die cavity in a die mold or the like so as to polish the ridges and other rough surfaces therefrom.

Another suitable form of holder upon and with which the new abrasive sheet 11 may be employed is illustrated in Figs. 6 and 7 of the drawings and comprises a holder member including a substantially conical-shaped or cup-shaped flexible body 25, which may be made of rubber or like resilient material. The body 25 has a base 26 in which a recess 27 is formed for the reception of an inwardly threaded ferrule 28 to which an externally threaded shaft 29 is attached. The body 25 has an open end or mouth 30.

In the use of the form of the holder shown in Figs. 6 and 7 the abrasive sheets or strips 11 may be preformed to proper size and disc shape or they may be made in any desired size and shape and peeled or separated from the pack 10 and cut to paper size, in the form of a disc, corresponding to the size and shape of the mouth 30

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of the substantially cup-shaped flexible holder body 25. The disc-shaped abrasive-coated sheet 11 may be adhered to the peripheral edge or rim 30 of the latter by means of the pressure-sensitive adhesive coating 16 thereon, with the body of the abrasive disc 11 stretched across the open end or mouth 30 of the holder body 25. The thus completed tool, shown in Figs. 6 and 7, may then be attached, by the shaft 29, to a chuck or the like of a portable electric power driven tool and rotated and used by a die maker for polishing the ridges and hills and valleys in die mold cavities and the like. During this usage the flexible cup-shaped body 25 will flex readily and enable the abrasive coated disc-shaped abrasive sheet 11 mounted thereon to penetrate into the valleys and other places in the die mold cavity into which it is impossible to penetrate effectively by means of an unmounted abrasive sheet or by means of any tool now known to or used by die makers.

It will thus be seen from the foregoing description, considered in conjunction with the accompanying drawing, that the present invention thus accomplishes its intended objects, and has the desirable advantages and characteristics, including those hereinbefore pointed out and others which are inherent in the invention.

I claim:

1. As a new article of manufacture, a pack of abrasive coated sheets arranged in superimposed relationship and each comprised of a flexible base sheet or carrier having on one side thereof a coating of finely divided abrasive particles adhesively secured to the said base sheet or carrier and having on its other and non-abrasively coated surface a film of a normally tacky, pressure-sensitive adhesive, the said abrasive sheets being adhesively but releasably secured together in superimposed relationship by adhesive engagement between the finely divided abrasive particles on each underlying sheet with the normally tacky pressure-sensitive adhesive on the next adjacent sheet thereabove.

2. As a new article of manufacture, a pack of abrasive sheets arranged in superimposed relationship and each comprised of a flexible paper base sheet or carrier having on one side thereof a coating of finely divided abrasive particles adhesively secured to the said paper base sheet or carrier and having on its other and non-abrasively coated surface a film of a normally tacky, pressure-sensitive adhesive, the said abrasive sheets being adhesively but releasably secured together in superimposed relationship by adhesive engagement between the finely divided abrasive particles on each underlying sheet with the normally tacky pressure-sensitive adhesive on the next adjacent sheet thereabove.

ADOLPH J. LARSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,814,553	Hope	July 14, 1931
2,018,611	Feuerstein	Oct. 22, 1935
2,059,583	Jackson et al.	Nov. 3, 1936
2,259,685	Elsloo	Oct. 21, 1941
2,286,208	Kirchner	June 16, 1942