

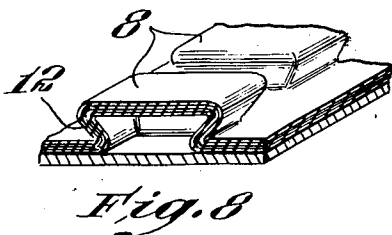
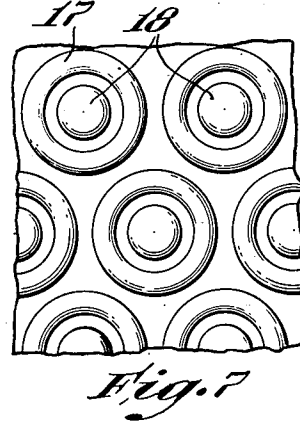
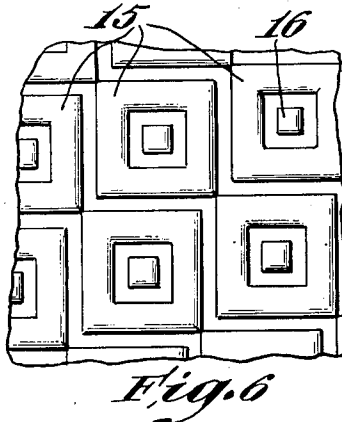
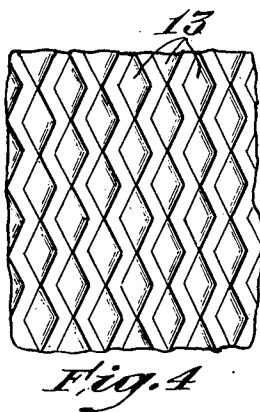
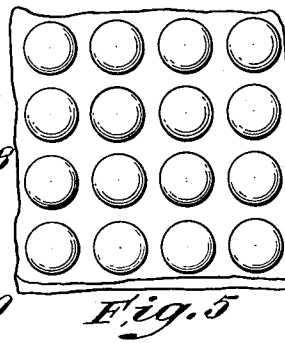
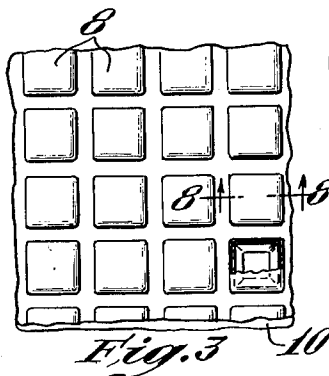
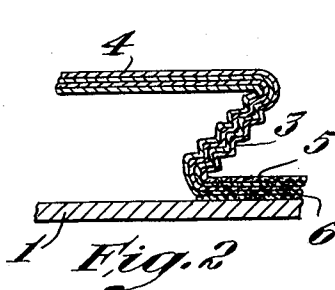
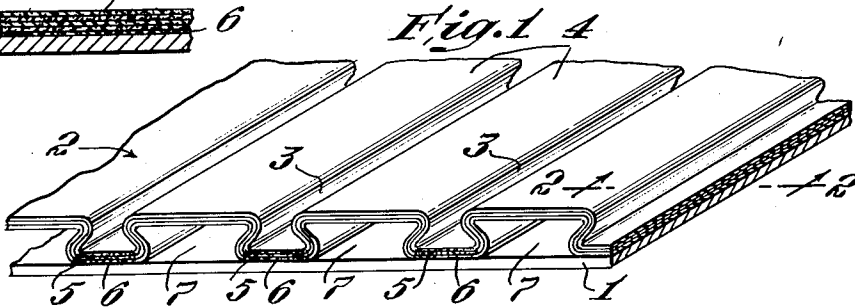
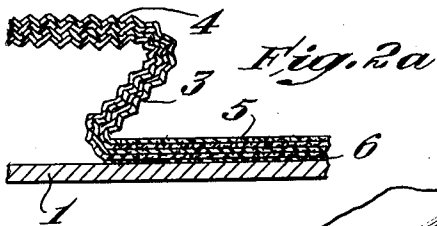
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2,622,051

SOFT FLEXIBLE PAD

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## UNITED STATES PATENT OFFICE

2,622,051

## SOFT FLEXIBLE PAD

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3 Claims. (Cl. 154—55)

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The present invention relates to a soft, flexible pad used to protect merchandise which has a high gloss surface from scratching or marring in shipment, in handling or in storing. In many materials as for instance, as highly finished furniture, wood surfaces, glass, pottery, or the like, scratches or other markings not only often mar the finish from the standpoint of beauty, but may frequently reduce the transparency or translucency of objects such as glass or plastics. Oftentimes this occurs even with the use of kraft wrapping paper and corrugated board.

The purpose of this invention is to produce a pad or a sheet which will have such softness that even when pressed against the finished surface to be protected, with considerable force, no blemishes in the surface will be found and no scratches even though the surface may be subject to rubbing or shifting in transit as often occurs in transportation by truck or rail.

In accordance with the principles of the present invention the pad or sheet comprises a multiple layer of thin, soft, slack sized flexible, absorbent paper webs which may be creped and which have relatively open formations providing very great flexibility. The pad or sheet also includes a backing sheet of paper or similar material which is coated with an adhesive to which multiple layers of the paper or paper-like web are adhered to in spaced flutings, lines, or configurations causing the webs to stand off from the backing sheet and provide additional resilience because of the raised enclosed areas. The invention additionally provides an efficient and positive means for packing an article whose surface is to be particularly protected without the uncertainty of holding soft surfaces against the faces of the article to be packed. Where goods are ordinarily packed, the soft paper webs are usually applied initially to the surfaces to be protected and then when the outer wrapping is put on, the soft surfaces are expected to remain in place but often they slip from their positions so that the coarser outer wrappings come in contact with the delicately high-finished surfaces. By incorporating the soft, fluted faced materials in a flexible sheet which may be used for wrapping purposes, the article can be completely and positively protected.

The invention will be more fully described in the specification set forth below when taken in connection with the drawings illustrating the invention in which:

Figure 1 shows a perspective view of the flexible pad of the present invention.

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Figure 2 shows an enlarged section taken on the line 2—2 of Figure 1, and,

Figure 2a shows a modification of the same.

Figure 3 shows a face view of a modification of the flexible pad,

Figures 4, 5, 6 and 7 show further modifications of the modification in Figure 3, and,

Figure 8 shows an enlarged section on the line 8—8 of Figure 3.

The pad of the present invention comprises a backing sheet 1 which may be durable but preferably flexible paper such as a good kraft paper or other types of paper or paperboard. The backing sheet should be of a high density but the thickness will vary with the specifications for the amount of weight and purpose for which the sheet is to be used. The backing sheet may, if desired, be made impervious to water or moisture, thereby retaining its strength over a long period of use. One surface of the paper is coated with an adhesive which may be an ordinary paste, glue, cement or some thermoplastic or cold adhesive. If desired this coating may extend over the whole surface or may be spotted on the backing sheet at points where contacts of the soft, superimposed web 2 is to be made.

The web 2 consists of a multiplicity of layers of very thin, preferably creped, flexible, slack sized latently absorbent paper or synthetic paper sheets such as may be made from natural vegetable fibers or a blend of natural and synthetic fibers of viscose, cellulose acetate, Vinyon etc., the synthetic fibers of which may in part be thermoplastic so that the adhesive on the sheet 1 may be dispensed with where the heat method of sealing of two sheet elements is employed. The web has relatively open formations and two or more layers should be employed together but preferably more than two, eight to ten layers being found very useful and good for this purpose. The webs in being applied to the backing sheet are all applied simultaneously by fluting or pleating the paper in certain desirable configurations.

In Figure 1 this pleating is shown by parallel rows of pleats 3 which bend inward under the top exposed surface 4 of the paper and then lies flat in the region 5 against the backing sheet 1 so that part of the contact face of the creped paper with the backing sheet is covered over or at least concealed by the top exposed surface area of the composite web itself. An adhesive 6 seals the multiple layers of web together and to the backing sheet by a penetrating seal throughout the sheets.

This particular type of formation, therefore provides a composite soft pad or sheeting in which a plurality of soft, open formation paper webs are held fixed on a backing sheet with a flexibility and resiliency imparted to the surface of the paper web because of the fixture of the multiple web to the sheets and the additional enclosed volume effected by the fluting or pleating which encloses a definite volume of air in the cavities 7, 7, surrounded by the web and the base sheet.

While the multiple web layer is of open formation, therefore permitting air to filter through it slowly, it is true that a certain amount of air will always be contained in the volumetric space 7 and this will act as a cushioning effect for the article whose surface bears on the top of the web. If the air is driven out of the space 7, it is driven out extremely slowly so that the desired soft cushion of the composite pad or sheet is fully obtained.

While in Figure 1 the fluted or pleated multiple webs are shown in parallel relation to one another and only sealing the air chamber 7 in long parallel sides, it is quite evident that if the only escape is the ends of the sheet, the space is still practically entirely enclosed. Where other types of configurations are used for the fluting effect, as for instance Figures 3, 4, 5, 6 and 7, the inner spaces may be entirely enclosed by the seal against the backing surface. This is illustrated somewhat diagrammatically in Figure 3 where a squared pattern is illustrated. Here the top creped or uncreped exposed surfaces areas 9 have pleated or fluted unexposed sides extending about the periphery of the square surface 8 where the webs are sealed to the base surface such as in the area 9 which come in contact with the back surface 10 of the sheet. The space 11, therefore, is completely sealed off and furnishes marked resiliency because of the air contained therein.

Figure 8 shows on an enlarged scale the manner in which the multiple layers are bent inward at the sides of the top surface with a V-shaped bend 12 which has above been designated as the pleated or fluted element. With very thin multiple webs and where only a few are used, quite exact figures even with sharp corners may be obtained and even with more layers of paper web as for instance 8 or 10 layers, quite sharp edges may be obtained without injuring the formation structure of the paper web.

Figure 4 shows a configuration in which the sheet surfaces are formed as diamonds.

Figure 5 shows an illustration where individual circles 14 are formed.

Figure 6 shows a group of rectangles 15 surrounding other rectangular areas 16, etc., and Fig. 7 shows the same arrangement in general as applied to circles where the outer circle 17 surrounds the inner circular area 18. Each of the configurations in Figures 4, 5, 6 and 7 have fluted sides or sides which are bent inward at an acute angle as illustrated in Figure 8 forming enclosed spaces which serve to provide resilient cushioning for the multiple web.

In the embodiments of the invention described above, the surface sheet which comes in contact with the article to be protected, comprises a multiple layer of soft paper web which should, for the best purposes, be absorbent, of open formation and low density. The paper webs are preferably initially creped and the creping should be maintained in the fluted areas which do not come in contact with the surface of the articles to be protected. For certain purposes however, it is

preferable to have the exposed surface of the sheets smooth, and for this purpose the creping on the top surface 4 as in Figure 1 may be eliminated or removed. The crepe surface, however, on the fluting provides additional volume of paper web material, sometimes an increase of perhaps 50% to 100% of the webbing and this insures added cushioning effect at close spaced intervals for the surface to be protected.

While it has been mentioned above that a combination of various types of fibers may be used, it should be noted that many types of fibers can be used. In the present case long fibered cellulose pulps give the best results and make the strongest webs. Also the webs may be made of a blend of cellulose vegetable fibers or a blend of natural vegetable and synthetic fibers of viscose, cellulose acetate, Vinyon or other plastic materials of a thermoplastic or thermo-setting character may be used.

Applicant, in the expression, "slacksized, latently absorbent," means partially sized in such a way that the absorption through the material is gradual and not particularly rapid, particularly so that the liquid adhesive which binds the backing sheet to the paper webs, will penetrate the webs while drying and dry without spotting or straining the outer facing of the web, although the outer web or sheet will be adhered with the rest of the web. Such slack sizing may be accomplished with rosin, wax emulsion, starch, hydroxyethylcellulose, carboxymethylcellulose, halogenated siloxanes, or any other suitable means in any desired way.

In the specification it has been mentioned that the webs are bent inwardly under the top surface which lies flat. This is accomplished simply by adhering the webs at the desired spots, lines, areas, etc., with sufficient web material between successive places of adhesion, and then permitting the sheet to fall flat lightly by rolling it, packing it, pressing it, or employing any other suitable means. Even use will accomplish the results providing the proper allowance of material is made.

Having now described our invention, we claim:

1. A composite sheet comprising a paper backing sheet of relatively heavy durable material and a plurality of layers of thin, soft, flexible paper web of open formation superimposed thereon, said webs having spaced areas standing away from the backing sheet surrounded by areas in which said webs make contact with the backing sheet, the sections of said webs between the areas standing away from the backing sheet and the areas in contact with the backing sheet being inclined under the areas of the webs spaced away from the backing sheet and being creped and means for cementing said layers to said backing sheet in the region of contact between the web and the backing sheet.

2. A composite sheet comprising multiple layers of thin absorbent paper webs of open formation and low density having a substantial creping, a paper sheet of closed formation and high density, a plurality of parallel pleats formed in said paper webs extending at an acute angle with respect to the webs towards the paper sheet thereby raising parallel areas of the webs above adjacent parallel areas in contact with the sheet, and means for cementing the webs to themselves and to the sheet in the areas where the web contacts with the sheet, said raised region being substantially wider than the depressed regions of the

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web, said paper sheets being coextensive with said webs over the whole extent thereof.

3. A composite sheet comprising multiple layers of thin absorbent paper webs of open formation and low density, a paper sheet of closed formation and high density serving as a back-sheet extending over the whole area of the webs, said webs being formed into a regular pattern with areas spaced from the backing sheet completely surrounded by portions in contact with the backing sheet and portions connecting the spaced areas with the portions in contact with the backing sheet, said connecting portions being inclined under the spaced areas and being creped, and means cementing the portions of the webs in contact with the backing sheets together with one another and to said backing sheet.

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