Sept. 28, 1965 H. M. SHATTO 3,208,837

METHOD OF MAKING A POT SCRUBBER

Filed Oct. 2, 1962

FIG. 1

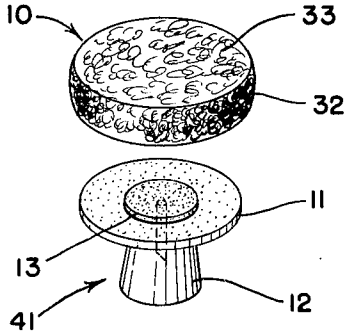


FIG. 2

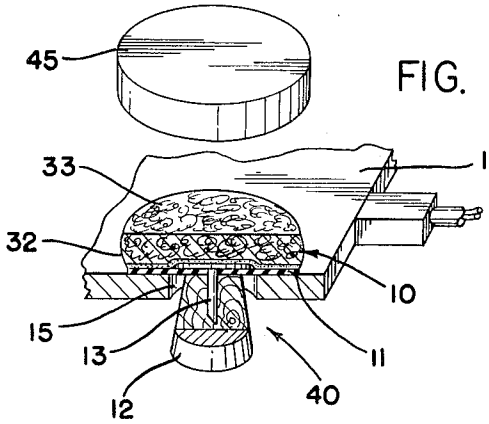


FIG. 3

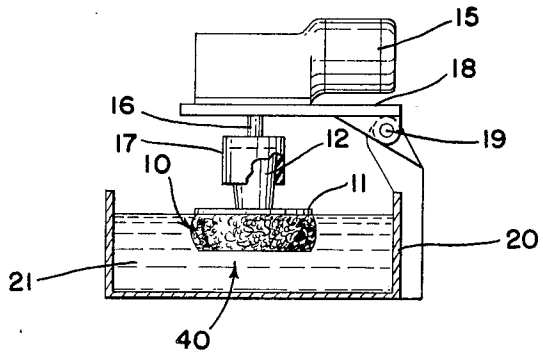


FIG. 4

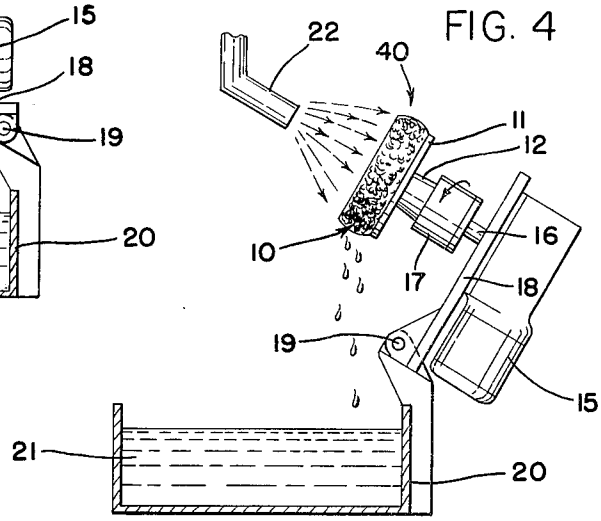


FIG. 5

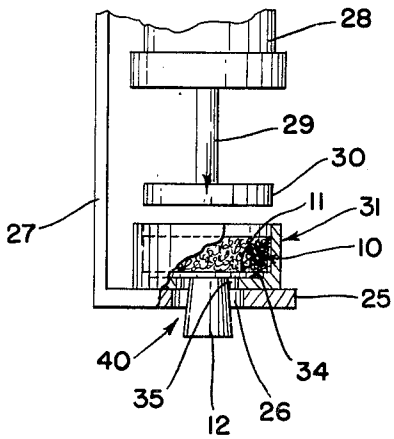
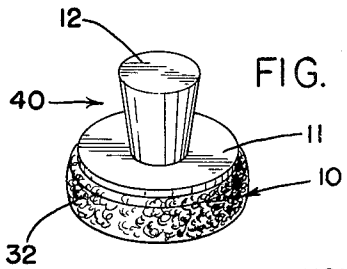


FIG. 6



INVENTOR.
HOMER M. SHATTO

BY

Fay & Fay

ATTORNEYS

United States Patent Office 3,208,837 Patented Sept. 28, 1965

3,208,837

METHOD OF MAKING A POT SCRUBBER

Homer M. Shatto, P.O. Box 88, Ashtabula, Ohio

Filed Oct. 2, 1962, Ser. No. 227,802
2 Claims. (Cl. 51—293)

This invention relates to improved construction of a scouring device having a handle means flexibly supporting an abrasive body. More specifically, the invention relates to a knitted metallic mesh of cylindrical configuration which is adhesively mounted upon a flexible backing member having a handle attached thereto. The knitted mesh is treated with a suitable resin so that, notwithstanding prolonged periods of hard use, the fibers of the mesh remain interlocked one to another, not only by the mechanical knit but also by the cohesive action of the resin itself. This construction insures that the scrubbing and cleaning device will retain its manufactured shape despite prolonged periods of rugged use while not interfering with the cutting qualities thereof. The term resin is used in the generic sense to include compositions known by that name, as well as including pigment reinforced elastomeric adhesives, which will be described hereinafter.

Scrubbing and cleaning pads and the like have become very popular in the cleaning of kitchen utensils and the like, and are presently consumed in large quantities. Despite this popularity, several difficulties are encountered in connection with their use. Difficulties arise because the pads, in order to be used effectively, are of necessity required to be gripped by the fingers of the users. The grip, of necessity, must be a firm one and in consequence thereof, there is a tendency to crush, tear, and distort the shape of the pad, with the result that the life of the pad is materially shortened. In cases where the pads are formed of metallic mesh and the like, a person with tender hands may receive fine splinters, cuts, scratches and mild abrasion of the fingers when using the same.

It is essential, from the cleaning standpoint, to have the water as hot as possible. Where the fingers are used to grip the pad, the water, of necessity, has to be of a temperature that may be endured by the person cleaning, thereby limiting the cleaning action.

The above objections were sought to be overcome by the provision of a handle means on a cleaning device. Varying degrees of success have been experienced in this endeavor, since the attachment of knitted, woven or matted copper wire or the like to a handle means was difficult at best. The major problem encountered was the physical attachment of the loosely woven mesh material to a handle or backing having a handle associated therewith.

In the development of handle supported cleaning devices, several approaches have been taken. One approach required a rigid backing with the knitted fabric or cleaning device adhesively attached thereto. Flexible backings have also been tried. Generally, in either case the bond between the backing member and the cleaning device is no stronger than the inherent strength of the knit, which, of necessity, must be soft and pliable. After a short period of use the cleaning pad becomes dislodged from the backing and handle because the strands of the weave were broken, or the mere distortion of the weave or mat was such that it was no longer usable for its intended purpose. Further disadvantages arise in the use of rigid backing members. It was almost impossible to clean the corners of rectangular pans, arcuate surfaces, and other non-planar surfaces of kitchen utensils, which normally require flexing of the pad.

Accordingly, it is an object of the present invention

to provide a pad and holding means which eliminates the foregoing difficulties and disadvantages.

It is a further object of this invention to provide a holder which securely grips the pad and additional means to impregnate the interstices of the pad to bond the fibers together, thereby greatly prolonging the life thereof.

It is a further object of this invention to provide a cleaning device which is light weight, comfortably used, and economical to manufacture.

It is a further object of this invention to provide a holder which is exceedingly simple, however, sufficiently rugged to withstand the normal hard use expected.

It is a still further object of this invention to provide a cleaning pad attached to a handle which will retain its manufactured shape through periods of hard use.

It is a further object of this invention to provide a novel method to manufacture the above described article with a minimum of effort and cost.

It is a further object of this invention to provide a means and method to impregnate foraminous bodies to increase the strength thereof without substantially impairing the porosity thereof.

Further and fuller objects will become readily apparent upon an understanding of the illustrative embodiment hereinafter described, reference being made to the accompanying drawing wherein:

FIG. 1 is an exploded view of the cleaning pad and handle assembly;

FIG. 2 is a perspective view of the assembled cleaning pad resting on a hot plate with the pad, backing member and handle in cross section;

FIG. 3 is a view illustrating the method of dipping the pad to impregnate the interstices of the copper cloth, the method embodying an electric motor on a pivotable mounting over a receptacle which is shown in cross section;

FIG. 4 is a view similar to FIG. 3 with the motor and pad tilted rearwardly, and a fragmentary portion of an air source means directed against the pad to expedite drying;

FIG. 5 is a view showing a press means with the dies in cross section for shaping the pad; and

FIG. 6 is a perspective view of the finished article.

Referring now to FIG. 1 therein is shown the exploded assembly **40** comprised of a pad portion illustrated at **10**, backing member **11**, handle means **12** and fastening means **13**. The pad **10** may be comprised of any suitable abrasive material, such as matted or knitted fibers, or other suitable types of material which are of a foraminous mesh or matted construction and have the necessary abrasive qualities to insure good cleaning action. In the preferred embodiment it is contemplated that the pad **10** will be composed of copper cloth.

The backing member **11** can be composed of any suitable or elastomeric material sufficiently flexible so as to allow bending to clean corners, crevices and hard to get at surfaces of pots, pans and the like. The handle **12** may be composed of any suitable material, such as wood, plastic or the like, having the qualities necessary to facilitate attachment of the elastomeric backing member **11** thereto.

In the illustrative embodiment of FIG. 1, the handle is composed of wood and the backing member **11** is attached thereto by a threaded nail having a large head integral therewith. It is contemplated that an elastomeric or plastic handle could be provided which would be integral with the backing member **11**.

A fuller understanding of the finished assembly **40** of FIG. 6 and the numerous advantages thereof can be had when reference is made to the method of manufacture. The pad **10** is composed of copper cloth formed in a stocking type configuration. It is stretched so as to de-

crease its diameter, and then rolled back upon itself to form a shape similar to a doughnut. The free end is twisted in the hole of the doughnut to prevent unraveling and the pad **10** is now ready for joining to the backing member **11**.

As an alternative method of preparing the pad, a ten inch length of a "stocking" is cut and folded in half to form a five-inch square. The corners are then folded toward the middle, thereby forming a smaller square. The folding operation is then repeated to provide a still smaller square. The square is formed into a circular configuration by placing it in the shaping die shown in FIG. 4. The scouring face formed thereby is substantially planar without the central swirl which is visible in pads formed by the rolling method. Any suitable method can be employed to form the pad, the particular selection being dictated by the result to be achieved.

The handle assembly **41** as shown in FIG. 1 is prepared by joining the backing member **11** to the handle **12** through the use of a suitable fastener **13** in the event a three part handle is used. It is obvious that this step may be omitted if an integral handle assembly is used. The exposed portion of the backing surface **11** is coated with a thermosetting resin or thermoplastic adhesive composition, such as Pliobond. Pliobond is a commercially known thermoplastic adhesive comprising a pigmented reinforced synthetic rubber fortified with plastic resin. The adhesive is available as a viscous fluid containing 20 to 40 percent by weight of solids, i.e., pigmented synthetic rubber and resin, and 60 to 80 percent by weight of solvent, such as methylethyl ketone. Only a resinous material combined with rubber gives the desired toughness required of a flexible adhesive. Thus, although a rubber adhesive provides elasticity, it is the combination with the resin that provides the toughness and hardness which contributes to the longevity of the adhesive material. Other adhesives or thermoplastic resinous compositions which may be used for purposes of this invention include the polyesters prepared by reacting unsaturated dicarboxylic acid with polyhydroxy alcohols, such as maleic acid or the anhydride, with diethylene glycol. Various physical properties can be imparted to these esters by substituting the acid or anhydride with other dibasic acids and by using more than one polyhydric alcohol. These polyesters are substantially clear viscous fluids which will polymerize with monomers that add to the double bond in the presence of a peroxide catalyst, to form a hard, infusible resin. The use of the term resin, adhesive or adhesive resin is intended to include the thermoplastic and thermosetting resins, elastomeric adhesives and solutions thereof.

In the instant case, a Pliobond solution with 30 to 40 percent solids has been found satisfactory for gluing the fabric to the backing surface. When the adhesive becomes tacky, the copper cloth doughnut or pad **10** is centered on the backing member **11** and pressed firmly thereagainst. The assembly **40** is then placed on a heating plate **14**, as illustrated in FIG. 2. The plate is provided with a suitable aperture **15** to allow the handle to extend therethrough, thereby bringing the uncoated side of the backing member **11** in contact with the plate **14**. The cloth is pressed firmly against the backing by suitable means, such as a press or the steel disc **45** shown. The assembly **40** remains on the plate for a period of about four minutes, with the temperature being maintained at 300° F. The heat of the plate cures the adhesive sufficiently to join the pad **10** to the backing member **11**.

The assembly **40** is then moved to the next station for impregnation of the pad with an adhesive solution, as illustrated in FIG. 3. A motor **15** drives a shaft **16** with a suitable rubber cup **17** at the end thereof. The motor **15** is mounted on a bracket plate **18** which is hinged at **19** to allow it to be tilted back, to facilitate easy insertion and removal of the handle **12** in the rubber cup **17**, and for a further purpose hereinafter to be described. The handle **11** is inserted into the cup **17** with a friction fit so as to be retained thereby. The motor is tilted forward so as to lower the pad **10** into the container **20** having an adhesive solution **21**, such as about a 20 percent solution of Pliobond. The motor is then rotated at one revolution per minute in order to insure thorough flow of the solution through the interstices of the pad **10**. The motor is then tilted back about its pivot **19** to the position shown in FIG. 4 so that the pad is at an angle of about 30° to the vertical, with the motor continuing to run at one revolution per minute. The tilting of the motor through an arc while the pad is being rotated results in a desirable distribution of the resinous adhesive throughout the pad and assures the proper bonding of the interstices of the pad material. The end position of the pad when the tilting of the motor has been completed permits a build up of adhesive on the backing member **11** where extra strength is needed. Also, the tilting of the pad through an arc prevents the undesirable accumulation of the adhesive on the bottom scrubbing surface **33**. After the excess adhesive has thus been lightly centrifuged and drained, a quick intermediate cure is effected by turning a low volume warm air blower on the impregnated cloth, the source being indicated schematically by the nozzle **22**. It is this combination of a slow rotation of the pad at various angles as the motor is tilted through an arc followed by a quick intermediate cure that provides the right degree of flexibility and durability of the product.

The assembly **40** is now removed from the rubber cup **17**, and placed in a forming press, such as the one indicated in FIG. 5. The press has a bed portion **25** with an aperture **26** therethrough of sufficient size to pass the handle **12**. An upstanding support portion **27** carries a suitable fluid motor, such as the hydraulic or air actuated ram shown fragmentarily at **28**. The piston rod **29** of the ram **28** extends towards the bed **25** and carries a shaping member in the form of circular die **30**.

A cup shaped die **31** is provided with a counterbored portion **34** at the bottom thereof to receive and center the backing member **11**. A suitable aperture **35** is of sufficient size to allow the handle **12** to pass therethrough. The cup shaped die **31** is of sufficient size so as to enable the shaping die **30** to be slidably received therein. Approximately 70 pounds of pressure is applied to the pad member to shape the same, which shape will be retained throughout the remainder of the curing process due to the intermediate curing step. The assembly is then removed from the press and final curing may be effected in any one of a number of ways, such as air drying, oven drying, and the like, depending on the resin selected. Some thermoplastic resins such as Pliobond may be cured at room temperature in about four days, or in an oven at 250° for 18 minutes. When an oven is employed to effect curing, the resin will become fluid in the sense that it is soft and pliable, but not soft enough to flow. A slight expansion is experienced after cooling; however, if found to be objectionable, the pad may be removed from the oven and placed in a forming die while the adhesive is still soft, and left therein while cooling is effected, whereby the exact shape will be retained.

The final cure serves to strengthen and finally set the adhesive resin and, of course, insures retention of the shape of the pad notwithstanding rigorous use. The resinous adhesive used is substantially unaffected by hot water, soap and detergents. After prolonged periods of hard use, a full abrasive surface will still be exposed on the bottom **33** of the pad as well as the edge portions **32** thereof. The original shape will be substantially maintained throughout this period, with the exception of a small amount of compression or wear.

It is obvious to those skilled in the art that the overall durability of the assembly **40** may be reduced by impregnating the pad with a diluted solution of resin. If such is necessary in the interests of a more economical manufacture, the distinctive advantages presented by the

novel cleaning pad will still remain, with a slight shortening of the life thereof. As noted, the pad **10** maintains its original full faced abrasive surface throughout prolonged periods of hard use. The outer wall portion **32** of the pad **10** continues to stand up under heavy use in the cleaning of the corners and sides of pots and pans. The mere failure of one of the strands will not cause the pad to disintegrate or unravel as was true in prior art models, since the Pliobond serves to hold the cloth in the position shaped by the press arrangement of FIG. 5. The resilient backing member **11** allows the cleaning surface to be flexed sufficiently to abrade hard to get at corners.

The use of the knob-like handle allows the application of quick direct pressure as well as the flick of the wrist maneuverability in use. The backing member **11** serves to protect the fingers from detergents and scouring materials as well as contact with the cutting surfaces of the pad **10**. Further, it permits the use of extremely hot water in scrubbing applications since the hands need not be immersed therein. The pad will retain the open weave necessary to insure good cleaning action despite hard use for prolonged periods. It is considered within the skill of those experienced in the art to provide cleaning agents in the finished pad.

It is obvious that the above disclosure, while specifically illustrating single application of the principles set forth, could be applied to other areas of manufacture. It is, for example, within the contemplation of this invention to apply the principle of supplementing the strength of the mechanical joint of matted or woven construction with a bonding means which will assist in holding the fibers together while not substantially impairing the foraminous property thereof.

Although a single illustrative embodiment has been employed, such was done only in the interest of effecting a complete description. It is, therefore, not intended that this nor the terminology used be limiting inasmuch as it is intended that the scope of the invention be defined by the spirit and scope of the appended claims.

I claim:

1. The method of manufacturing a cleaning pad mesh assembly having a handle and flexible backing member associated therewith and a pad connected thereto comprising the steps of coating said flexible backing member with a resinous thermoplastic composition, applying the foraminous pad to said backing member, heating said

pad and backing member at a heat sufficient to bond said composition to said pad and backing member, immersing said pad in a solution of a thermoplastic composition and rotating said pad while so immersed, removing said pad from said thermoplastic composition and rotating slowly to drain and centrifuge the excess and retain and diffuse a controlled amount, drying said pad while continuing to rotate said pad thereby to effect an intermediate curing, shaping said pad before said cure is complete, and further curing said pad so that the resin will be completely set.

2. The method of manufacturing a cleaning pad assembly having a handle, a flexible backing member secured to said handle and a foraminous pad mounted on said flexible backing member comprising the steps of coating said flexible backing member with a thin film of resinous thermoplastic composition, applying the foraminous pad to said backing member, heating said pad and backing member at a heat sufficient to bond said composition to said pad and backing member, immersing said pad in a solution of a resinous thermoplastic composition and rotating said pad while so immersed, withdrawing said pad from said resin, and pivoting said pad through a vertical arc to a position of over 90° but less than 180° while continuing to rotate the same, applying warm air to said pad to effect an intermediate curing at the termination of said pivoting movement, shaping said pad before said cure is fully completed and further curing said pad so that the resinous composition in the pad will be completely bonded to the interstices of the pad material.

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CHARLES A. WILLMUTH, *Primary Examiner.*