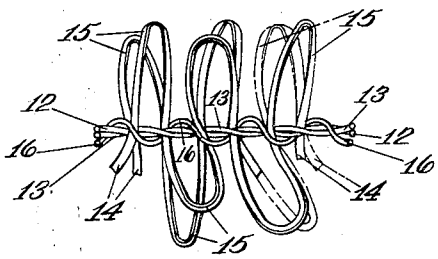
Feb. 12, 1935. W. C. PROTZ 1,990,840

SCOURING MATERIAL AND DEVICE

Filed Jan. 7, 1932 2 Sheets-Sheet 1

Fig. 1



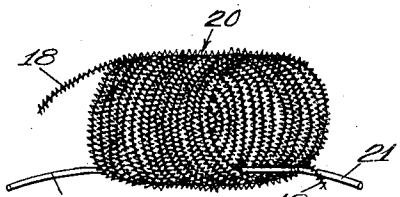


Fig. 3

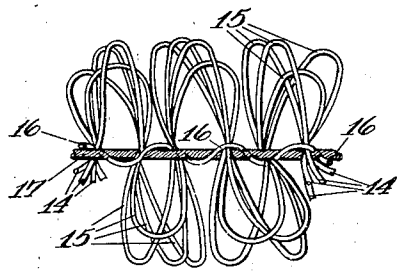


Fig. 2

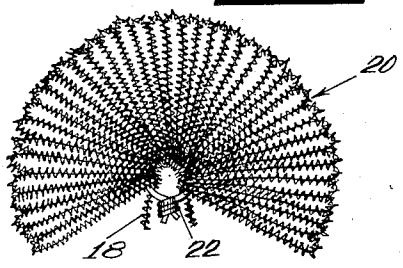
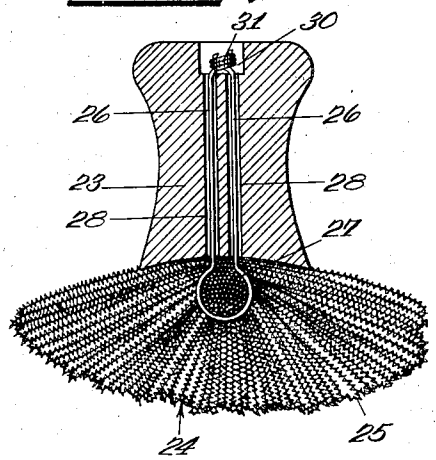


Fig. 4

Fig. 5



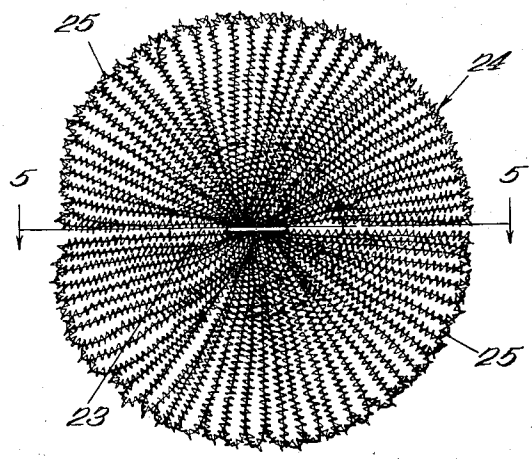


Fig. 6

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Feb. 12, 1935. W. C. PROTZ 1,990,840

SCOURING MATERIAL AND DEVICE

Filed Jan. 7, 1932 2 Sheets-Sheet 2

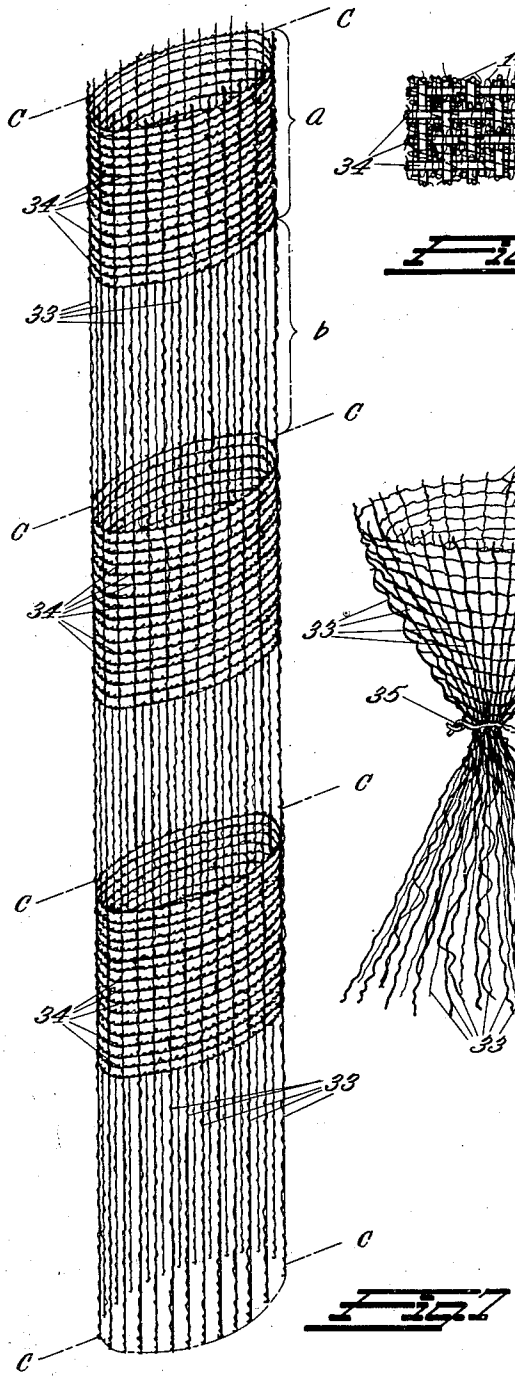


Fig. 7

Fig. 8

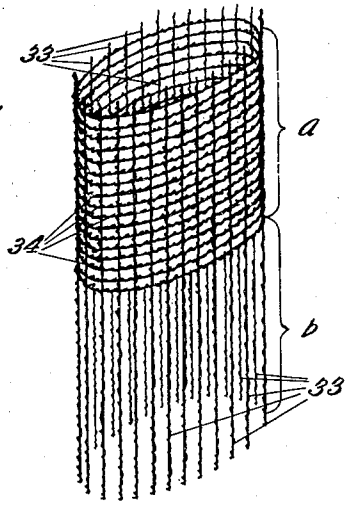


Fig. 9

Fig. 10

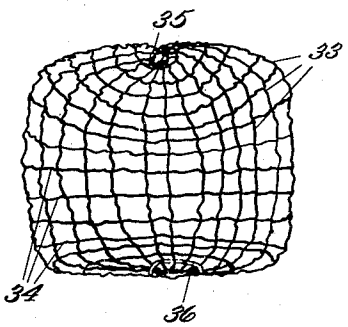


Fig. 11

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1,990,840

SCOURING MATERIAL AND DEVICE

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Application January 7, 1932, Serial No. 585,338

9 Claims. (Cl. 117—52)

The present invention relates to improved scouring devices, such as implements for cleaning and polishing kitchen utensils and the like, and to particular methods and special materials that may be employed in the manufacture of them and other similar devices.

This invention is especially concerned with materials and devices which embody strands of copper or the like in the form of ribbons that are twisted, coiled or looped to present a number of scouring edges. There are three common types of devices on the market embodying strands of this general character but none of them is wholly satisfactory because in each instance the scouring efficiency or durability, or both, are insufficiently great. One of these common types comprises simply a quantity of loosely bunched metallic ribbon that has been twister or crimped. It has no definite structure or shape, and hence not only lacks permanence of appearance but also is not positive in its scouring action, due to the fact that the scouring edges may move freely in all directions.

The second common type of device consists of ribbons looped or knitted into a metallic mesh fabric. The surface of a pad or the like formed of this material will not readily change its shape to gain scouring access to small recesses and corners, and its definite arrangement of scouring edges is such that efficient scouring action is obtained only when the device is moved in two particular directions. Moreover, a break in the meshwork will expand itself into a large gaping hole.

The third type of commercial device comprises elongated coils of metal ribbon freely surrounding a wire gimping strand or core and looped, rolled or otherwise formed and tied into pads, rolls, rings or the like. The chief objection to this type of implement is that the coils are freely slidable axially of the wire core when they are pushed into engagement with a surface to be cleaned, and hence have insufficient resistance to create an efficient scouring action. They are otherwise objectionable because the breakage of the ribbon or of the core at one point will permit a large amount of material to free itself and hang from the implement in the form of strings.

Accordingly it is a major object of the present invention to eliminate the above disadvantages present in old forms of scouring devices, by providing a built up strand of the ribbon type that has relatively great strength and high scouring efficiency. This object is accomplished by firmly binding one or more coils of metal ribbon upon an elongated center core in such manner that a plurality of closely spaced loops of ribbon radiate from the core, with respect to which the loops are securely held against both axial and transverse movement.

It has heretofore been proposed to produce a scouring strand by winding one end of a piece of cord upon itself after it had been inserted in the form of a core through a coil of wire. This old idea has not gone into commercial use, however, for the reasons that the operation was manually performed and hence too costly, the cord could not be wound tightly enough to hold the loops of the coil in place, and the strand could be made up only in relatively short lengths. The strand of the present invention, on the other hand, is inexpensively produced by machine methods in any desired lengths; and due to the types of core and binding materials employed and due to the twisting tension introduced by the machine operation, the loops or individual spirals of the coiled ribbon are securely fastened to the core.

Another major object of the present invention is to provide an interwoven metallic fabric for use as a scouring material. My interwoven fabric has several advantages over the conventional knitted fabric, chief among which is that the interwoven strands present a much greater number of scouring elements or edges per unit of area. These scouring elements in an interwoven device form in effect a brush-like dense mass of scouring bristles or projections which are effective in every direction of movement of the device, whereas the scouring edges presented by a knitted fabric are necessarily few in number and each is effective in only one direction of movement.

The improved scouring strand previously discussed is especially adapted for the manufacture of an interwoven scouring fabric. The cores of the strands form the warp and weft of the fabric; and the loops of scouring ribbon, that are immovably bound upon the cores, fill the spaces between the warp and weft and assist in maintaining said warp and weft in definitely crossed relationship to one another.

Further major objects of the present invention are to devise new and improved scouring implements and methods for making the latter, and especially to utilize the strands and interwoven material of this invention in producing said improved implements.

These and other important objects of my in-

vention will appear upon a study of the following detailed description, taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a greatly enlarged showing of a short piece of a scouring strand that has been manufactured in accordance with the present invention.

Figure 2 is a similar enlarged view of a modified type of strand construction.

Figure 3 illustrates one step in the formation of a novel scouring device from a coiled strand like or similar to those seen in Figures 1 and 2.

Figure 4 represents the completed novel device mentioned in the preceding paragraph, with a portion of the strand material removed for clarity of illustration.

Figure 5 discloses, in longitudinal central section as seen on line 5—5 of Figure 6, a different type of scouring implement wherein the invention resides in an improved method of fastening scouring strand material upon a knob or handle.

Figure 6 represents a bottom plan view of the device seen in Figure 5.

Figures 7–11 inclusive disclose a novel method for producing a scouring ball or the like having a cover formed of interwoven metallic fabric. The strands forming the warp and weft of the fabric are diagrammatically indicated for clarity of illustration, and may be like those of Figures 1 and 2 or any similar known type. More specifically:

Figure 7 is a perspective view of a portion of a cross-woven tube designed to be cut transversely into sections capable of manipulation into the form of scouring implements.

Figure 8 represents an enlarged fragment of the cross-woven fabric of Figure 7, the scouring material of the fabric strands being shown only diagrammatically.

Figure 9 is a perspective view of one of the sections cut from the tube of Figure 7.

Figure 10 is a similar view showing the next step consisting in drawing and holding the material together intermediate the ends of the section.

Figure 11 is an elevational view of the final scouring ball that has been completed by manipulating and tying the device seen in Figure 10.

With continued reference to the drawings, wherein like elements are designated by like numerals, and with particular reference for the moment to Figure 1:

The strand structure of Figure 1 comprises a core element, scouring ribbon and a binder element for securing the ribbon upon the core element. The latter may consist of a single wire, cord or the like but in this illustration it preferably comprises a pair (or more) of flexible wires 12, 13 uniformly twisted together to form, in effect, a unitary elongated core having spiral grooves throughout its length. It is preferred to form the several strand elements of non-corrosive and lasting material such as copper, for example.

The scouring element of the strand comprises one or more (two in the illustration) thin metallic ribbons 14 that are twisted somewhat uniformly along the length of the core to form a plurality of loops 15 which radiate from their points of contact with the core. The looped ribbon is securely held in engagement with the core by the binder element 16 in such manner that the uniform size of the loops is maintained and that the legs of the latter engage the core at substantially equally spaced points.

The binder element 16 consists of a flexible wire that is very tightly twisted in spiral form about the core and which, in its final form, is whipped in and out through the looped ribbon so as to securely tie the latter upon the core. In the illustration, the binder wire is shown somewhat loosely wound for the sake of clarity, whereas in actual practice this wire 16 follows one or both of the spiral grooves (i. e., natural helical formation caused by twisting the wires 12, 13), so closely that it is difficult to distinguish it from the core. During the application of the binding wire 16, most of the ribbon coils will naturally be drawn flatwise against the core at points located in the aforementioned spiral grooves, as illustrated, and hence are unable to slip axially of the core as might occur if the latter consisted merely of a single hard surfaced wire of uniform cross section.

The points of binding engagement are not all on the same side of the core, and hence the loops radiate in a plurality of directions from a plurality of points along the length of the core so that when viewed endwise the strand has the appearance of a rosette. This ensures that the strand will have an efficient scouring action regardless of how or in what form of implement it is used, since all of the radiating loops have edges designed for scouring and polishing purposes.

The above described strand is manufactured entirely by quantity production machine process, in any desired length. The method consists in coiling the ends of one or more ribbons while drawing them off a spool, simultaneously feeding the core wires axially into the coiled ribbon, and at the same time whipping and twisting the binder wire into engagement with the ribbon and the core while drawing the finished strand away from its point of manufacture. In a preferred method, a flier operates to coil the ribbon upon a short stationary mandrel. The core wire is drawn under tension through the mandrel substantially axially of the coiled ribbon. The binder wire is fed from a point outside the coil to a point adjacent the mandrel. The ribbon, core and binder are drawn together under tension away from the mandrel at high speed and simultaneously twisted, with the result seen in Figure 1.

The strand is thus cheaply produced in great quantities, and yet assembled so tightly as to have the qualities of durability and permanence. The ribbon loops are flexible but held fast against bodily movement relative to the core as the strand is rubbed against a surface which tends to displace the loops during the scouring operation. Should one of the loops be broken or cut, there is no tendency for the adjacent ribbon loops to pull out. Even when the strand itself is cut, its elements show a remarkable resistance to unraveling.

The scouring strand of Figure 2 is in most respects very similar to that of Figure 1, is manufactured by substantially the same method, and is capable of producing the same efficient results. Its core may comprise a single pliant and relatively soft cord 17, although it will be understood that several like cords might be twisted together to form the core. A plurality of ribbons 14 (four of them are somewhat diagrammatically illustrated) are tightly bound upon the core in the form of loops 15 by means of the binder wire 16.

The wire 16, being harder than the cord and tightly twisted thereon, becomes partially embedded in the core, with the result that the separate groups of loops are securely held in position upon the core. In final form, therefore, the core of the strand of Figure 2 has a forced spiral groove corresponding to the natural spiral groove of that in Figure 1.

The bunched loop effect in Figure 2 can be obtained either by starting with a plurality of wire ribbons upon the ribbon-feeding bobbin; or by using only a single ribbon and performing the twisting operation in such manner that the binder wire will be drawn into engagement with the core only after several individual convolutions of the coiled ribbon have been separated from the complete coil. In like manner, the loop of Figure 1 may be formed from either a single or a double ribbon.

The scouring implement of Figure 4 comprises a ball or doughnut-shaped device that may be formed with strand material like that of Figures 1 and 2. Figure 3 discloses the first step in the manufacture of the implement, which step consists in winding a scouring strand 18 into the form of a sleeve-like coil 20, and inserting a flexible piece of tie wire 21 axially through the coil. The ends of the strand may be wrapt, twisted or otherwise fastened to the tie wire, after which the ends of the latter are drawn toward each other and twisted together to form the holding ring 22 seen in Figure 4. The convolutions of the coil 20 having originally been packed close together in Figure 3, they now will expand somewhat and form a complete rosette comprising loops of strand material radiating outwardly from the tie ring 22. Some of the loops have been removed in Figure 4 to reveal the tie wire which otherwise would have been concealed by the spongy mass of scouring material. The completed device may next be flattened somewhat in the plane of the tie wire 22 so that the resulting product will have the shape and appearance of a circular metallic sponge or doughnut-like pad.

In Figures 5 and 6 there is shown another type of implement that may be made from such scouring material as that illustrated in Figures 1 and 2. This type of implement is broadly old, the only novelty residing in the specific method and means for securing a bunch of scouring material upon a handle. The implement comprises a knob 23 designed to be conveniently grasped by the fingers and to which has been fastened a bunch of scouring material 24. The latter consists of an elongated strand looped back and forth to form a somewhat flattened coil having end loops 25, as might be done by winding or reeling the strand upon a stick endwise of the latter.

The attaching means comprises a U-shaped wire 26 having a circular base 27 saddled upon the strand coil between the ends thereof, and having its legs projected through a pair of holes 28 drilled in the knob 23. The outer ends of the holes terminate in a circular recess 30 cut in the end of the knob. The ends of the tie wire are twisted together to form a substantially concealed knot 31 within the recess. The twisting operation places the legs of the wire under tension and causes the loop 27 to squeeze the central portion of the strand coil and draw it into firm engagement with the knob. For clarity of illustration the wire loop 27 is shown in Figure 6 as dividing the strand coil into two symmetrical portions, but actually the bunch of scouring material of the finished implement is sufficiently expansible to conceal the loop 27 and to assume the appearance of a continuous circular pad.

Figures 7–11 inclusive disclose the several steps of a method for manufacturing scouring implements from an interwoven metallic fabric. Figure 7 shows, somewhat sketchily a portion of an elongated cylindrical sleeve that has just been taken off the weaving machinery. The sleeve embodies peripherally spaced warp strands 33 running continuously throughout its length, and a plurality of longitudinally spaced weft strands 34 interwoven with the warp strands at regular intervals along the sleeve. The sleeve then comprises a number of identical sections, each of which embodies a cross-woven portion of length *a* and a somewhat longer portion of length *b* without any weft strands. This construction may be accomplished by automatically stopping and starting the weft feeding mechanism at regular intervals.

The sleeve of Fig. 7 is cut transversely on the planes of the lines *c*—*c* to separate the sections into individual units such as seen in Figure 9, each unit of which is adapted to form a scouring implement in a manner hereinafter described. The interwoven fabric material, as more fully shown in the enlarged fragmentary detail of Figure 8, is formed by cross lacing the warp and weft strands 33 and 34 respectively in and out among each other by a conventional weaving method.

The spacing of the strands preferably is such that the scouring ribbon elements 14 of each strand mingle with and cling to those of adjoining parallel strands, with the result that the original spacing of the strands is not easily disturbed during use of the implement. Maintenance of the spacing is further assisted by a similar clinging action at the points where the weft strands cross the warp; and the tendency of the warp strands adjacent the planes *c*—*c* to detach themselves from the material after the cutting operation, is resisted. It will be seen, therefore, that the strand material of Figures 1 and 2 is especially adapted to the formation of an interwoven fabric.

The next step, as illustrated in Figure 10, is to grasp any two adjacent warp threads 330 of the loose strand portion *b*, wind them tightly in opposite directions about the middle of the unit adjacent the lowermost weft strand, and then tie them together as at 35. Since the sole purpose of this step is to constrict the sleeve at the tied point, it will be obvious that the step can be carried out in various other ways,—as by tying with a single strand or with a separate cord or wire, or by grasping the bunch of free warp strands and twisting them axially as a body with respect to the cross-woven portion.

The bunch of freely depending strands 33 now are crumpled or otherwise formed into a loose ball, and the upper cross-woven portion is turned inside out to form an envelope or cover for the loosely balled material. By then turning the free edge of the cross-woven material inwardly and drawing it together with a lacing tie wire 36 the scouring ball or sponge of Figure 11 is the resulting finished product. No attempt has been made, in drawing the implement of Figure 11, to include the multitudinous loops of ribbon which form a part of the interwoven strands, but it will be appreciated that the structure and

appearance of the ball surface are similar to those of a continuous layer of intermingled bristles.

Independently of the specific illustrated method, interwoven metallic fabric of this character may be incorporated in other equally efficient types of scouring implements such, for example, as those of mit, pad, and ring formations.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive the scope of the invention being indicated by the appended claims rather than the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patents is:

1. A flexible scouring strand comprising an elongated core element, a quantity of scouring material such as metal ribbon or the like arranged along said core to form substantially radial scouring projections thereon, and a binder element comprising a wire or the like twisted tightly around said core element and engaging said scouring material to prevent the latter from moving bodily relative to said core element, said core being of such nature that, when the strand is completed, the core has means for preventing axial movement of said scouring projections.

2. In the strand structure defined in claim 1, said radial projections being somewhat uniformly arranged to radiate outwardly in all directions from the core, whereby an effective scouring action is obtained regardless of the position of the strand relative to the surface to be cleaned or polished.

3. In the strand structure defined in claim 1, said radial scouring projections being arranged in groups each of which is held against the core by the binder at a single point.

4. A scouring strand which when completed comprises an elongated core having a spiral groove extending axially throughout its length, a quantity of scouring material distributed along said core, and an elongated binder element wound tightly about said material and cooperating with the spiral groove of said core to hold the former in firm engagement with the latter.

5. In the strand structure defined in claim 4, said binder element being tightly spiraled within said groove.

6. In the strand structure defined in claim 4, said core comprising several wires or the like twisted together, and said groove consisting of a spiraling channel naturally formed during the twisting operation.

7. In the strand structure described in claim 4, said core comprising a relatively soft cord or the like and said binder element comprising a relatively hard wire or the like, whereby said spiral groove results from the binder becoming embedded in the cord when the former is wound tightly around the latter.

8. A fabricated scouring material comprising a plurality of scouring strands interwoven in crossed relationship, each strand comprising a core and a plurality of radially extending scouring elements of metallic ribbon fastened on said core, the mesh size of weaving being so related to the lengths of said radial scouring elements that the scouring elements of adjoining strands intermingle in overlapt relationship.

9. A woven metallic scouring fabric comprising warp and weft scouring strands, each strand comprising an axial core and a plurality of ribbon scouring loops securely fastened upon said core against movement longitudinally of the latter.

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