April 14, 1959 A. S. ROCK 2,882,139

PROCESS OF MANUFACTURE OF BUFFING ELEMENTS

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Fig. 1.

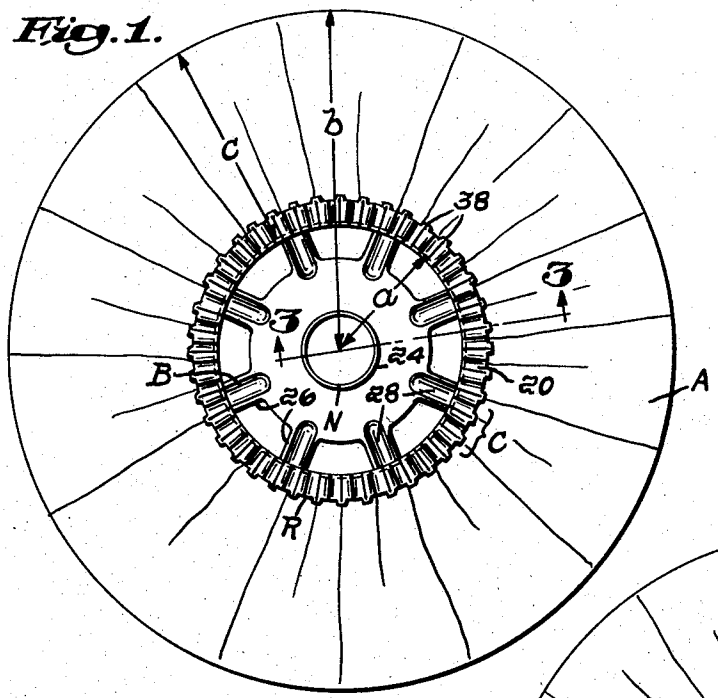


Fig. 2.

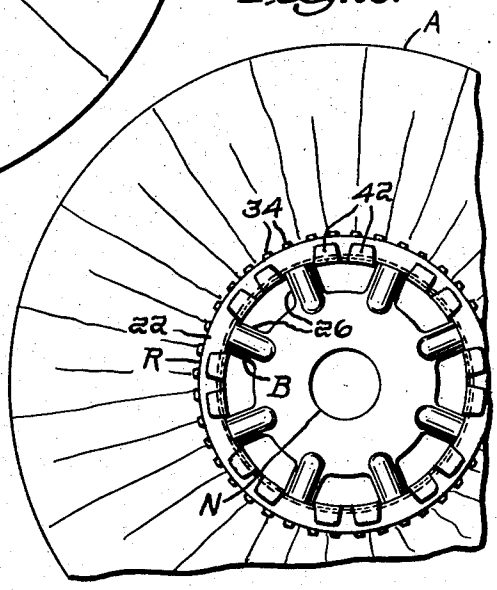


Fig. 9.

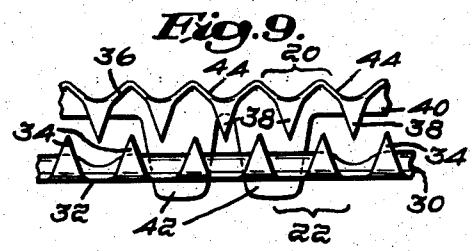
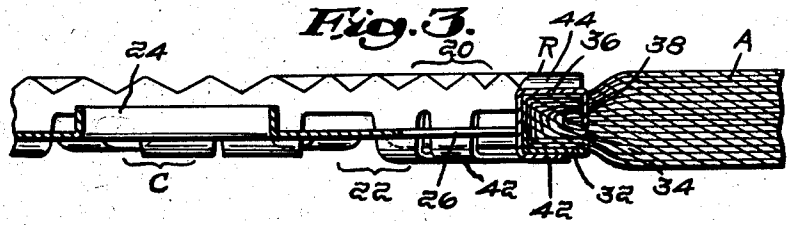


Fig. 3.



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Fig. 4.

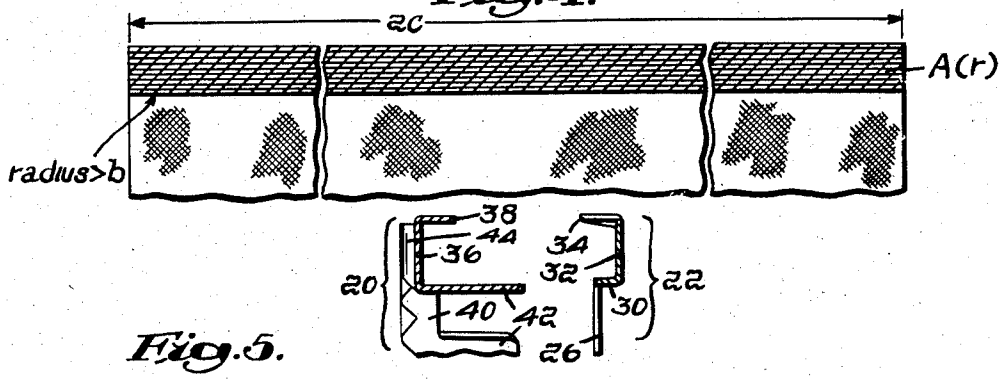


Fig. 5.

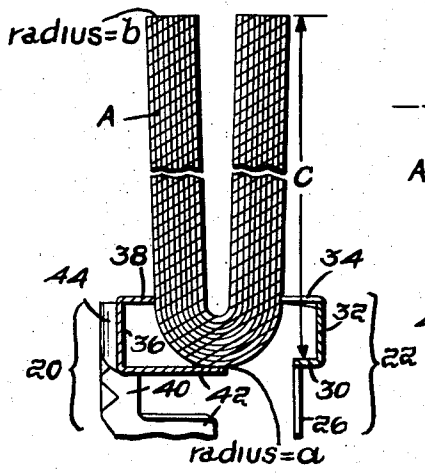


Fig. 6.

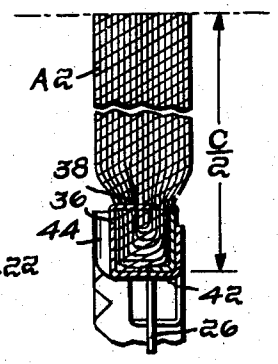


Fig. 7.

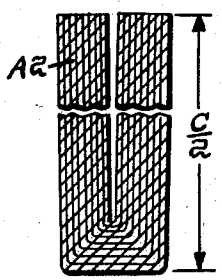
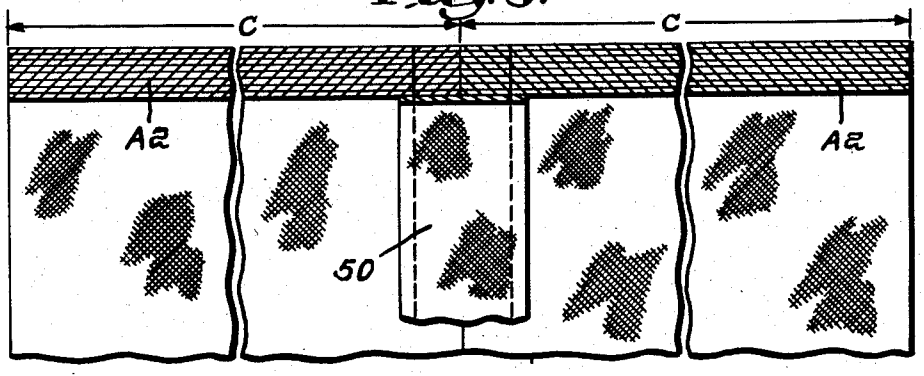


Fig. 8.



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2,882,139

PROCESS OF MANUFACTURE OF BUFFING ELEMENTS

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Application February 12, 1957, Serial No. 639,800

1 Claim. (Cl. 51—293)

This invention relates to a process for manufacturing buffing elements. It is based on the conception that if an annulus of buffing material of a certain type is supported by a suitable type of metal center itself capable of being expeditiously and cheaply dismantled without damage to the annulus, then the material salvaged from two such annuli after they have been worn down in depth may be utilized in a further step to produce a single full-sized section substantially identical with the originals.

A well-known type of buffing element, the so-called "ruffled buff," is made from an effectively continuous ring comprising a strip of bias fabric wound on itself in the form of a cylinder and comprising a multiplicity of plies. Such a ring is folded on itself along a center line with concomitant compaction of the material adjacent that line, and usually, although in lesser degree, throughout the width of the ring to provide two flat annuli side by side, having pleatings or rufflings produced incident to its transformation in form. This duplex annulus is mounted on a supporting center of one kind or another.

Such a device is in a sense a buffing wheel and might be used alone, but since it has a relatively narrow face, it usually in practice will be what is termed a "section," adapted to be assembled with other sections to form a buffing wheel or cylinder having an external cylindrical working face of comparatively great width.

Such an element wears rapidly in use. In production work a large fraction of the radial depth of the buffing wheel is worn away in a period measured in hours. If the user has such a use for it, it may be shifted to another job with different demands for a further period of use and wear, but in general, even if so extended, its useful life is short. It cannot be worn away right down to the center. The buffing material is usually mounted on the center in a permanent manner, whether the center is made of fiber board of various kinds or is an expendable metal center and the section is considered as a single use or expendable device. It may have some salvage value, but the parts are not recovered except with considerable labor and in a deteriorated condition unfitting them for new uses comparable to the old.

In accordance with the invention a buffiing element is utilized having a sheet metal supporting center, an example of which is herein shown and described, the complete assembled buffing element being of such nature that, after predetermined wear, it may be returned to the manufacturer where, because of its construction, it may be dismembered and at least the buffing material recovered in such unimpaired condition and in such form as to provide material for the making of a buff element substantially identical with the original. The metal center may be considered expendable, although as will appear, salvage and reuse of at least a part thereof may be economically practicable.

The invention will be well understood by reference

to the following drawings, showing by way of example a preferred illustrative embodiment of the invention wherein:

Fig. 1 is a side elevation showing one face of a buffing element including a center which face, merely for differentiation, is here called the obverse face;

Fig. 2 is a fragmentary side elevation showing the opposite or reverse face;

Fig. 3 is an enlarged section on line 3—3 of Fig. 1;

Fig. 4 is a schematic view showing an early step in the manufacture of the element illustrated in Fig. 3;

Fig. 5 illustrates a further stage;

Fig. 6 is a fragmentary section showing a portion of an element as shown in Fig. 3 after the buffing material has been worn away for a considerable depth;

Fig. 7 shows the buffing material as recovered from a worn element as shown in Fig. 6 after dismantling;

Fig. 8 shows two units as illustrated in Fig. 7, joined to provide a cylindrical ring or band, ready for incorporation in a buffing element essentially like that shown in Fig. 3; and

Fig. 9 is a fragmentary view looking radially inwardly of a portion of the outer periphery of the members of the center, slightly separated axially.

Referring now to Figs. 1, 2 and 3 of the drawings, I here show a center, denoted as a whole by the reference letter C, supporting an annulus of buffing material denoted generally by the letter A. The center may be compared to a wheel in that it has a central portion or nave, an intermediate body portion B corresponding to the spokes (or the web of a disc wheel) and a peripheral or rim portion R which supports the annulus A which, in a way, corresponds to the non-metallic tire of a wheel. The buffing material A in the completed element is a generally flat annulus with an internal radius a, an external radius b (that of the completed section) and a depth $(b—a)$ marked c on Fig. 1. In the form illustrated in Fig. 3, as it is originally made and supplied to the trade, the annulus consists of two annuli set side by side, each having a number of plies or strata and integrally joined at the inner circumference.

Thus, in accordance with the known practices of the art, a cylindrical band or ring (like a napkin ring) may be formed of a strip of bias fabric having a width $2c$ wound in a multiplicity of turns to form a ring. This ring is marked $A(r)$ in Fig. 4, the letter r being suggestive of the word "ring." The ring $A(r)$ has a radius not only greater than a but, when the buff is to be ruffled at its outer periphery, substantially greater than b. The sides of the ring are folded outwardly along its center line and at the same time the material is compacted circumferentially into pleats or rufflings so that the radius of the inner circumference of the resulting annuli is reduced to the dimension a, and that of the outer circumference to the dimension b. Such a proceeding is not new, but it is emphasized that the material in the present instance is not subjected to any treatment, other than the folding or crumpling, which would be inconsistent with its recovery, substantially undeteriorated, as hereinafter described. Thus, in contrast with many buffs, it is not impregnated with plastic or stiffening material along its inner periphery to consolidate that portion in a solid mass, nor are fasteners used which might affect the integrity of the material or which could be withdrawn only at prohibitive labor cost and with probable further impairment of that integrity.

In contrast with such practices the annuli when brought to the form shown in Fig. 5 are mechanically held at their inner circumferences and effectively secured by the center C, formed by separate parts which are closed thereon in the manner of clamping jaws, but which may

be dismantled readily after use, to release the annuli after they have been worn down to a lesser radius, say one equal to one-half of dimension *c*, but otherwise, except for the pleating which may readily be extended and flattened out practically like new.

There will next be described the preferred form of sheet metal center C, herein illustrated. It comprises two generally circular parts, obverse **20** and reverse **22**. The reverse section **22** herein comprises the nave portion N with a drawn out sleeve **24** to receive in a supporting shaft the body portion B having openings at intervals defining between them the spoke-like members **26**, herein eight in number, which are herein stiffened by impressed radial ribs **28** throughout their length and which merge into a short cylindrical portion **30** which in cooperation with parts of the obverse section **20** defines the bottom of an outwardly opening channel to receive the interior circumference of the annulus A of buffing material, there being an outwardly extending flange **32**, one of the flanges of the aforesaid channel, at the outer end of the part **30**. The flange **32** at its outer margin is provided with inturned spurs **34**, preferably parallel to the axis of rotation.

The obverse member **20** is herein open-centered and comprises a flange **36** forming the opposite side of the channel and having spurs **38** extending inwardly therefrom, a short cylindrical portion **40** at the inner side of the flange **36**, from which extend ears **42** lying in a cylindrical surface and being adapted to pass through the openings between the spokes **26**, being received against the interior of cylindrical part **30** of the reverse member, and to have their ends bent over on the radial flange **32** of the reverse member as seen in Figs. 2, 3 and 6.

In Fig. 4 the two members of the center are shown separated, positioned centrally within the band A(*r*). The band A(*r*) is transformed into the duplex annulus as shown in Fig. 5, the interior radius of which corresponds substantially to the radius, *a*, of the bottom of the channel which is formed by the cooperation of the two center members as shown in Fig. 5. The two members are then brought together axially tightly to embrace and clamp the annulus and are locked together by turning over the ears **42** on the flange **32** as seen in Figs. 2 and 3. The spurs **34** and **38** enter into the body of buffing material A. These spurs are out of line in the respective two elements so as not to interfere with each other. They are preferably triangular in form as seen in Fig. 9 and they are of a length to extend at least substantially to and conveniently slightly beyond the center line of the completed section so that each set of spurs engages the adjacent annulus substantially throughout the thickness of the same. The material is tightly compacted circumferentially in pleatings or rufflings at the inner circumference which ruffings however are in a sense free from one another. In practice the spurs appear to find their way into the interstices of the ruffings without a laceration of the material itself, except to a negligible amount. At the same time, after clamping together of the center forming members **20** and **22**, the material is firmly held in its upset or ruffled form by the clamping engagement therewith of two gripping jaws which secure a mechanical interlock to the annulus by means of the spurs, preventing displacement of the buffing material under the stresses occurring in use. It is pointed out that the spurs have no rearwardly presented shoulders which on dismantling of the section might catch and lacerate the material in separating the center forming members from the buffing annuli.

The two members of the center may be separated and the section dismantled by unbending the ears **42** and separating the two members **20** and **22** axially. It would of course be tedious to pry up the ends of these ears manually with a screwdriver in an individual case, but under production conditions it is easy, by means of a suitable appliance, to exert inward or centripetal force thereon to straighten them out.

The economic advantage of the construction is availed of by the following additional steps of the novel method. The buff section as originally manufactured may conveniently be marked on its side to indicate a depth equal to about one-half of *c* (some allowance for trimming is provided for in practice). When the annuli are worn down to that mark as indicated in Fig. 6, the user retires the buff from use and returns such worn down sections to the manufacturer. The center is dismantled and the folded section of reduced depth withdrawn. Temporary means for securing the plies together during handling may be utilized. The duplex annulus as recovered from the worn down buff is shown separated in Fig. 7, and is marked A2, the 2 indicating that it is in a second stage as compared to its original state, as illustrated in Fig. 5, for example. The duplex annulus of Fig. 7 has a depth equal to one-half of *c* and an interior radius equal to *a*. It may be unfolded and the pleatings or rufflings extended to form a cylindrical ring of a width *c* and a radius greater than *b* and equal to that of the ring A(*r*) in Fig. 4. Two such salvaged rings may be set side by side as seen in Fig. 8 and joined by an auxiliary ply or narrow band **50** as seen in Fig. 8, thus providing a band with a width **2***c* and a radius greater than *b*, essentially equivalent to the band A(*r*) as diagrammed in Fig. 4. Thus the ring shown in Fig. 8 may have the two parts at either side of its center line folded together, outwardly and upwardly in the figure, and the assembly may be circumferentially compacted in the same way as the band A(*r*) in Fig. 4 and grasped by members **20** and **22** of a center, to provide a new buffing element substantially duplicating that illustrated in Fig. 3. This may be worn down through half its depth. The process then cannot be repeated because we would recover only bands having a width of one-fourth of *c* which could not be utilized in the manner shown in Fig. 8. The user purchases and wears out two buffs of a given size and at a moderate cost, less than that of a new buff, gets another as good as new to wear out.

By way of precaution, to insure the integrity of the element under the conditions of use, the sheet metal may conveniently be made a little heavier than that which has hitherto been used in expendable sections. Thus, by way of example merely and without limitation, in the case of a section of 14 inch diameter, sheet metal .042 inch thick has been used. The economy resulting from the salvage and reuse of a reconstituted section equivalent to the original is such as to permit this even if the center is scrapped when first removed. However, the obverse section **20** obviously is recovered unimpaired. The reverse section may require a closer inspection and possibly a reshaping of the ears **42**, although the metal is such that it would stand several bendings without appreciable weakening. Under particular conditions of course a slight additional labor charge could be justified, since the parts are to be used only twice. In any instance the manufacturer will receive back two centers for each reissued buffing element and the dismantling, justified alone by the salvage of the valuable buffing material, will also at least supply him with a marketable supply of clean segregated scrap. Probably it would be preferred in any event to use new centers for original elements as in Fig. 5, unless perhaps under emergency conditions in time of war.

As seen in Figs. 1 and 9 the flange **22** of the reverse member may have radial corrugations **44**. The inwardly facing crests press into the base of the adjacent annulus and interlock the same. When a number of "sections" are assembled to form a wheel of relatively great width of face, these corrugations provide exteriorly passageways to permit air entering throughout the space between the spokes **26** to pass out between the sections and keep them cool. The outwardly facing crests of the corruga-

tions bear on the flat faces of the turned over ears 42 of an adjacent section which ears are in such number as to occupy substantially all the circumference between the spokes and provide an even bearing for the corrugations and also serve as spacing elements cooperating therewith, slightly to increase the airway.

As seen in Fig. 9 the inward indentations of the corugations are opposite the roots of the spurs 38 and extend into the bases thereof, stiffening the spurs.

Certain features of the metallic center herein described are claimed in application Serial No. 677,053, filed August 8, 1957, that application being a continuation in part of the present application.

I am aware that the process described may be practiced by utilizing elements of physical constructions other than those described, if they have the general relationship and form required to permit the substantially unimpaired recovery of the worn down annuli of buffing material, and the specific disclosure is to be considered in all respects as illustrative and not restrictive, as is in fact clear in several matters from the description itself. Reference is to be had to the appended claim to indicate those principles of the invention exemplified by the particular embodiment described and which I desire to secure by Letters Patent.

I claim:

The process which comprises detaching and spreading out into the form of a cylindrical band the fabric from each of two used buffing sections of known type wherein a wide cylindrical band of plied fabric is folded outwardly about its center line and secured in folded position by mechanical gripping jaws clampingly engaging the same in a radially shallow zone adjacent the fold line, which sections have been worn away to approximately half their radial depth, joining one circumferential edge of each to a circumferential edge of the other by means not substantially increasing the thickness adjacent the line of juncture, folding them outwardly along their line of juncture into side-by-side relationship and securing the joined circumferential portions to a supporting center, thereby to produce a single full-sized section charged throughout its circumference and to a substantial radial depth with buffing compound.

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