Nov. 8, 1932. J. W. GOTTSCHALK ET AL 1,886,671

METALLIC BUNCH AND METHOD OF MAKING IT

Filed May 31, 1932 2 Sheets-Sheet 1

Fig. 1.

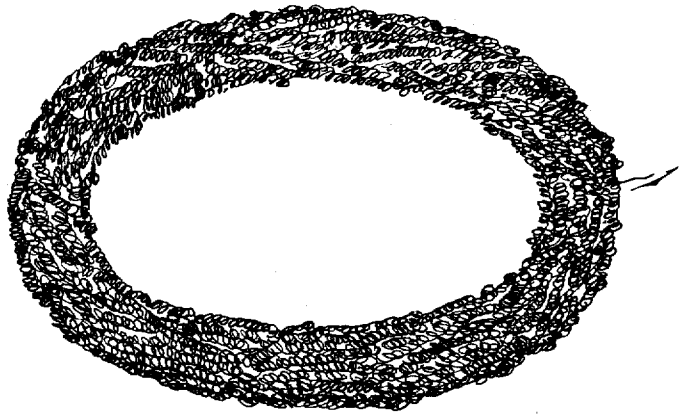


Fig. 2.

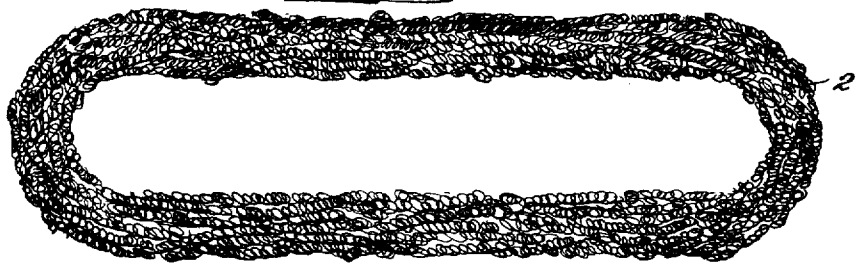
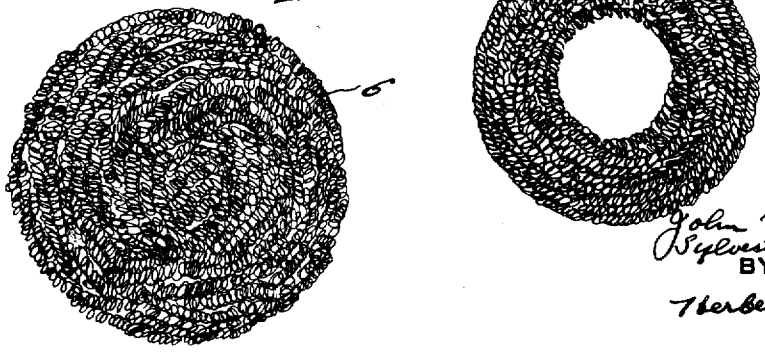


Fig. 3.



Fig. 4. Fig. 5.



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Fig. 6.



Fig. 7.

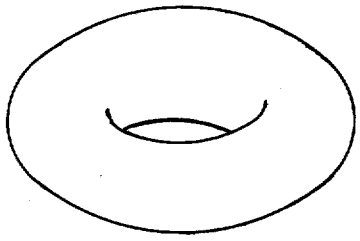


Fig. 10.

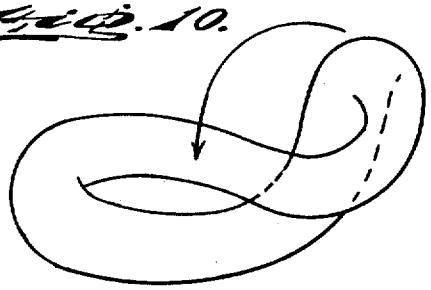


Fig. 11.

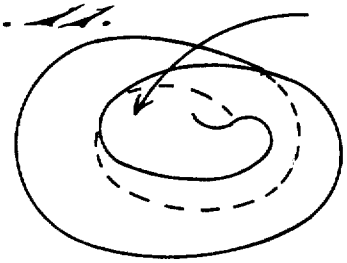


Fig. 8.

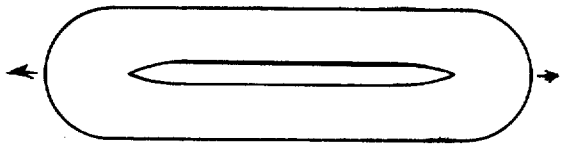


Fig. 12.

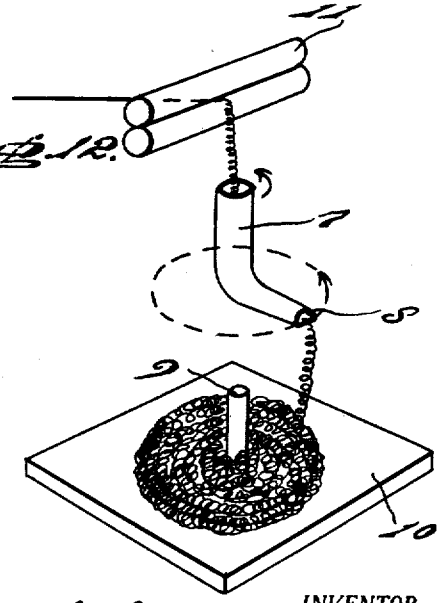


Fig. 9.

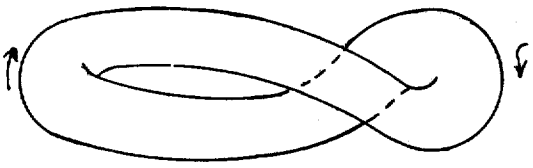
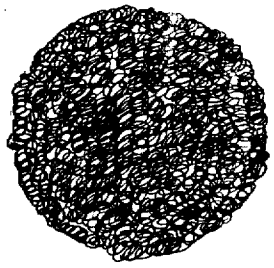


Fig. 13.



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Patented Nov. 8, 1932 1,886,671

UNITED STATES PATENT OFFICE

JOHN W. GOTTSCHALK AND SYLVESTER W. GRATER, OF PHILADELPHIA, PENNSYLVANIA; SAID GRATER ASSIGNOR TO SAID GOTTSCHALK

METALLIC BUNCH AND METHOD OF MAKING IT

Application filed May 31, 1932. Serial No. 614,504

There is now on the market a flexible and resilient metallic bunch formed from a metal strand to which has been imparted an inherent tendency to curl, the strand being tangled together to form a bunch of material. This produces a loose bunch and is adapted for a large variety of uses, such as, for example, an abradant, a polisher, filter, and many other purposes.

It is the object of our invention to devise a novel method of forming a metallic strand in the form of a helical coil into a flexible and resilient bunch so that the bunch will be interlocked throughout its mass.

A further object of our invention is to devise a novel flexible and resilient metallic bunch of material specially adapted for polishing, abrading, cleaning and other purposes.

With the above and other objects in view, as will hereinafter more clearly appear, our invention comprehends a novel flexible and resilient metallic bunch.

It further comprehends a novel flexible and resilient metallic bunch comprising a metal strand in the form of a strand having an inherent tendency to curl into a close helical coil with overlapping turns, the helical strand being wound with the coils of adjacent strand interlocking in a novel manner so that the bunch will be resilient throughout its mass so that if the bunch is deformed it will, when released, return to substantially its normal formation.

It further comprehends a novel flexible and resilient metallic bunch having its peripheral portion in tension around the central or core portion.

Other novel features of construction and advantage will hereinafter more clearly appear in the detailed description and the appended claims.

For the purpose of illustrating the invention we have shown in the accompanying drawings typical embodiments of it, which, in practice, will give satisfactory and reliable results. It is, however, to be understood that the various instrumentalities of which our invention consists can be variously arranged and organized, and our invention is not limited to the exact arrangement and organization of these instrumentalities, as herein set forth.

Fig. 1 is a plan view showing a skein of metallic material which may be employed to make the flexible and resilient metallic bunch embodying our invention.

Figure 2 is a plan view of the skein in one stage of the operation.

Figure 3 is a plan view at another stage of the operation.

Figure 4 is a plan view of the completed metallic bunch.

Figure 5 is a plan view of another embodiment of our invention.

Figure 6 is a view of the strand, on an enlarged scale, in detached position, showing it stretched from its normal position in order to more clearly bring out the helical coil formation.

Figure 7 represents, diagrammatically, the skein in the first step of the operation where it is to be twisted and folded within itself to form the bunch.

Figure 8 shows, diagrammatically, the next step of the operation where the skein is stretched.

Figure 9 shows, diagrammatically, the next step of the operation where the skein has been twisted.

Figure 10 shows, diagrammatically, the next step of the operation where one loop end portion is about to be turned towards the other loop portion.

Figure 11 shows, diagrammatically, the position of the bunch when one end loop portion has been turned into the other loop portion.

Figure 12 is a diagrammatic view, showing the strand being fed from the feed rolls and wound around a core.

Figure 13 is a view showing the bunch after it has been worked together to form the flexible and resilient metallic bunch, with juxtaposed strand portions interlocking to maintain the bunch formation.

Similar numerals of reference indicate corresponding parts.

Referring to the drawings:—

In forming the metal strand from which the

bunch is made the metal strand may be subjected to a flattening operation to change its form in cross section although this is not necessary. The metal strand while being fed and under tension is passed over a curling edge which works one face of the metal so that the opposite face is stretched. The result of this is that as soon as the tension is released the strand assumes the form of a helical coil which preferably is substantially continuous but which, if desired, may have straight stretches and coiled stretches. The metal strand after it passes the curling edge may be drawn between rolls so that when released from tension it will assume the contour of a helical coil and this coiled metal strand is then wound around a core to form a skein 1, consisting of a desired number of interlocking turns to be made. This skein may, of course, assume any desired contour and in Figure 1, we have shown the skein as formed by coiling up the metal strand. The skein is then stretched to assume the form as shown at 2 in Figure 2 and it is then twisted upon itself as shown in Figure 3, forming the looped ends 3 and angularly disposed connection strand portions 4 which cross each other at 5. The loops are then brought together and one is moved within the other and the bunch is then stretched and retracted so that it assumes the bunch formation 6, shown in Figure 4. It will be clear from Figure 4 that the bunch is flexible and resilient and that when stretched and released it will return to substantially its normal bunch formation. In Figure 7 we have shown diagrammatically the skein before it is stretched, and Figure 8 is a view similar to Figure 2 but showing the skein as having been stretched. In Figure 9, we show the same idea of twisting the skein to form loop portions as shown in Figure 3, it being understood that the twist may take place centrally as shown in Figure 3, or near one end as shown in Figure 9. One loop portion is then turned in, in the direction of the arrow seen in Figure 10 and assumes the position seen in Figure 11. The bunch is now subjected to pressure in any desired manner, for example, mechanically or by the hands of the operator so that the juxtaposed strand portions are interlocked throughout the mass of the bunch and the other portion is circumferentially disposed in tension around the inner portion.

In so far as we are aware we are the first in the art to form a flexible and resilient bunch of this character wherein the coils interlock throughout the bunch, and we desire our claims to such features to receive a broad and generic interpretation.

It is not essential that the skein be twisted before it is worked together because juxtaposed portions of the strand can be interlocked without the necessity of employing this step and the bunch will still be resilient.

The bunch seen in Figure 5 may be formed by winding the strand around a body which may have any desired shape in cross section but which is preferably cone-shaped.

When the skein is removed from the core the tension inherent in the strand may have sufficient tension to cause it to close the opening in the central part of the skein so that juxtaposed strand portions will interlock and maintain formation of the bunch. In some cases the strand portions may be worked together to cause this interlocking.

In Figures 12 and 13 we have illustrated more in detail another manner in which a flexible and resilient metallic bunch may be manufactured. The coiled metallic strand as it leaves the feed rollers 11 passes through a revolving tubular spindle 7 having its discharge end 8 offset so that the coiled strand will be circumferentially disposed in an irregular fashion around the core 9 carried by the table 10. As soon as the desired amount of material collected is on the core the strand is cut. The mass of strands which have been received on the core are then removed and the operator works the mass of strands together so that juxtaposed strand portions interlock substantially throughout the area of the bunch thus formed, and, as will be apparent, the strands at the outer portions are circumferentially disposed around the inner strand portions. In this manner a flexible and resilient metallic bunch is formed which is a somewhat looser bunch than that shown in Figure 4.

It will be apparent that in both forms of our invention as herein shown the strand portions are circumferentially disposed under tension at the outer portion of the bunch so that they press against the inner portions of the bunch.

It will now be apparent that we have devised a new and useful metallic bunch and method of forming it which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while we have, in the present instance, shown and described preferred embodiments thereof which will give in practice satisfactory and reliable results, it is to be understood that these embodiments are susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described our invention what we claim as new and desire to secure by Letters Patent, is:—

1. The method of making a flexible and resilient metallic bunch, which consists in coiling a coiled metal strand into skein formation, twisting the skein intermediate its ends, bringing opposite loops of the skein one within the other to make a bunch formation, and

working the bunch together to cause the interlocking of juxtaposed coils of the metal strand.

2. A flexible and resilient metallic bunch, comprising a coiled metal strand formed into a skein with the skein twisted and opposite loop portions of the skein brought one within the other and the mass worked together so that juxtaposed coiled strand portions interlocked with each other substantially throughout the mass of the bunch.

3. A flexible and resilient metallic bunch, comprising a coreless metallic strand having an inherent tendency to form a helical coil, said strand being wound upon itself with juxtaposed strands interlocking with each other throughout its mass to form a flattened, flexible and resilient metallic bunch, with the outer strand portions circumferentially disposed around the inner strand portions.

4. The method of making a flexible and resilient metallic bunch, which consists in coiling a coreless metal strand having an inherent tendency to form a helical coil into skein formation, and working juxtaposed strand portions of the skein formation together to cause such juxtaposed strand portions to interlock substantially throughout the mass of the bunch thus formed, and maintain the bunch formation, with outer strand portions of the bunch circumferentially disposted around inner strand portions of the bunch.

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SYLVESTER W. GRATER.

DISCLAIMER

1,886,671.—*John W. Gottschalk* and *Sylvester W. Grater*, Philadelphia, Pa. METALLIC BUNCH AND METHOD OF MAKING IT. Patent dated November 8, 1932. Disclaimer filed January 31, 1935, by the patentees.

Hereby enter this disclaimer to claim 3 which reads as follows:

"3. A flexible and resilient metallic bunch, comprising a coreless metallic strand having an inherent tendency to form a helical coil, said strand being wound upon itself with juxtaposed strands interlocking with each other throughout its mass to form a flattened, flexible and resilient metallic bunch, with the outer strand portions circumferentially disposed around the inner strand portions."

[*Official Gazette February 26, 1935.*]

working the bunch together to cause the interlocking of juxtaposed coils of the metal strand.

2. A flexible and resilient metallic bunch, comprising a coiled metal strand formed into a skein with the skein twisted and opposite loop portions of the skein brought one within the other and the mass worked together so that juxtaposed coiled strand portions interlocked with each other substantially throughout the mass of the bunch.

3. A flexible and resilient metallic bunch, comprising a coreless metallic strand having an inherent tendency to form a helical coil, said strand being wound upon itself with juxtaposed strands interlocking with each other throughout its mass to form a flattened, flexible and resilient metallic bunch, with the outer strand portions circumferentially disposed around the inner strand portions.

4. The method of making a flexible and resilient metallic bunch, which consists in coiling a coreless metal strand having an inherent tendency to form a helical coil into skein formation, and working juxtaposed strand portions of the skein formation together to cause such juxtaposed strand portions to interlock substantially throughout the mass of the bunch thus formed, and maintain the bunch formation, with outer strand portions of the bunch circumferentially disposted around inner strand portions of the bunch.

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SYLVESTER W. GRATER.

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