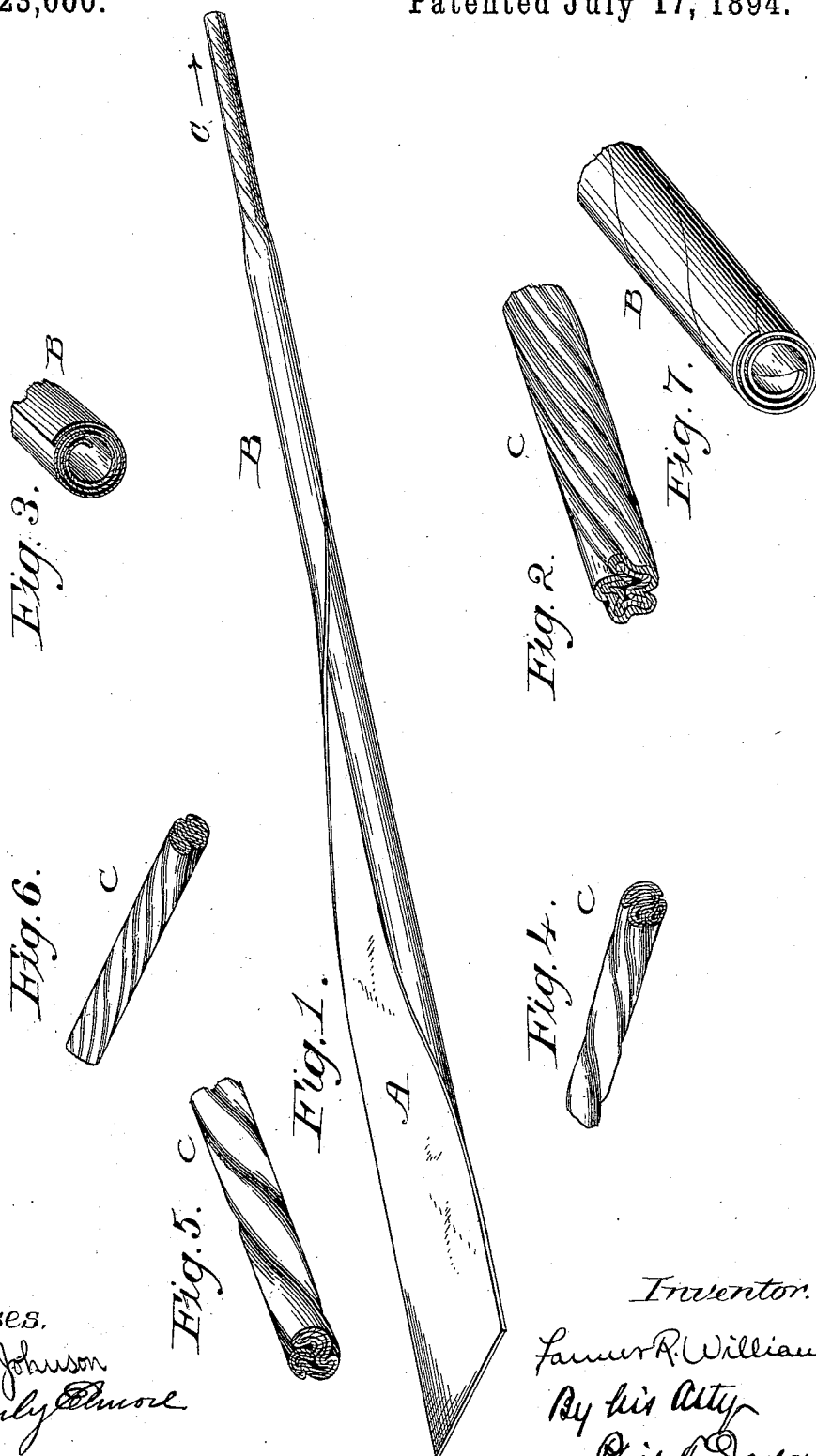


(No Model.)

F. R. WILLIAMS.
TWINE FOR GRAIN BINDING HARVESTERS.

No. 523,060.

Patented July 17, 1894.



Witnesses,
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UNITED STATES PATENT OFFICE.

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TWINE FOR GRAIN-BINDING HARVESTERS.

SPECIFICATION forming part of Letters Patent No. 523,060, dated July 17, 1894.

Application filed September 4, 1889. Serial No. 322,973. (No specimens.)

To all whom it may concern:

Be it known that I, FARMER R. WILLIAMS, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Twine for Grain-Binding Harvesters, of which the following is a description, reference being had to the accompanying drawings.

The object of the invention is to produce from paper a strong twine of uniform size adapted for use in grain-binding machines and for similar purposes.

The paper is commonly made of tensile strength such as to justify its use in the manufacture of twine for binding grain provided the twine is of such structure as to render the tensile strength of the paper fully available. The essential requirements in the utilization of the paper are, that it shall be so formed or fashioned into twine that when the latter is subjected to strain the strain shall be applied as nearly as possible in the direction of the length of the paper strip, instead of transversely thereof; that the raw edges of the strips shall not be exposed, and that the twine shall not be liable to open or untwist as it passes through the guides and other parts of the binding machine.

With these ends in view I form my twine by first cutting the paper into strip form, then winding the strip into the form of a tube, and finally, indenting, crushing or collapsing the tube and thereafter twisting the same into twine.

I am aware that in leather belting a flat strip of leather has been prepared by folding its two edges inward and then curled or wound helically so as to bring these rounded edges together in position to abut one against the other at the surface in the successive convolutions. This differs materially, however, from my method of manufacture in that there is no conformation of a distinct tube; no crushing of the tube and no twisting of a crushed tube into a hard twine and, in fact, no twisting whatever of the strand in the sense in which that word is commonly employed.

I am aware that a paper strip has been twisted or spun into a twine. The distinguishing feature of the present twine lies in the fact that

the paper is first formed into a tube, the tube then collapsed, and thereafter twisted. The twisting of a collapsed tube secures a peculiar distribution of the strip within the twine, or, in other words, produces a twine in which the strip follows a different course, and presents a different appearance from that found in twine otherwise produced; the peculiarity being advantageous in that the strain is brought longitudinally, instead of transversely on the strip, and in that the strain is distributed with substantial uniformity throughout the width of the strip.

In the accompanying drawings, Figure 1 is a perspective view showing my twine in its completed condition and also in the different stages of manufacture. Fig. 2 is a perspective view of the twine on a larger scale. Fig. 3 is a perspective view showing one mode of forming the tube to be subsequently twisted into twine. Figs. 4, 5 and 6 are perspective views of the twine formed of a tube crimped or collapsed in different forms. Fig. 7 is a perspective view showing another mode of forming the tube.

Referring to Fig. 1, A represents a flat strip of paper which may be of any appropriate stock or material.

B represents a tube formed by coiling or rolling the paper strip transversely as shown on a larger scale in Fig. 3 so that it presents two or more thicknesses or convolutions one surrounding another; and C represents the finished twine formed by collapsing and twisting the tube until it presents in cross section a closed compact body essentially such as shown on a larger scale in Fig. 2. It will be observed that in this form the twine presents in cross-section successive layers or thicknesses of paper one around another, and that the paper strip extends lengthwise through the twine at a comparatively slight angle to its axis, that is to say, in lines approximately parallel with the longitudinal axis of the twine. It is also to be observed that the twine presents a close compact body, and that it is adapted like ordinary hard twisted twine to pass through or around the guides of the binder and to withstand the action of the tying and clamping devices without liability to untwist.

In Fig. 4 I have shown a twine identical with that in the preceding figures except that it is formed from a tube collapsed by a smaller number of creases or indentations. In this
5 form there are but two indentations of the tube on opposite sides so that the internal overlying laminae present in cross-section approximately the form of the letter "S."

In Fig. 5 there are three distinct indentations or creases of the tube which is formed and twisted as in the other examples.
10

Fig. 6 shows the twine formed from a tube indented in still another form and tightly twisted.

15 In Fig. 7 a tube is shown previous to its being indented or twisted, as formed of a strip of paper wound helically so as to present at all points several layers or thicknesses wound one upon another.

20 Having thus described my invention, what I claim is—

1. The improved twine consisting of a strip of paper wound into tubular form, crushed or collapsed into a compact body, and tightly
25 twisted.

2. The improved paper twine in the form of a collapsed and compacted twisted tube.

3. The method of manufacturing paper twine consisting in first twisting a paper strip into the form of a complete tube and thereafter
30 collapsing and tightly twisting said tube.

4. The method of manufacturing twine consisting in forming a paper strip into a tube with two or more thicknesses in cross-section, indenting and creasing said tube longitudinally at different points, and finally, twisting
35 the collapsed tube bodily into a hard twine.

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Witnesses:

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