

UNITED STATES PATENT OFFICE.

JAMES LYALL, OF NEW YORK, N. Y.

TWINE.

SPECIFICATION forming part of Letters Patent No. 377,263, dated January 31, 1888.

Application filed September 9, 1887. Serial No. 249,255. (Specimens.)

To all whom it may concern:

Be it known that I, JAMES LYALL, of the city and State of New York, have invented an Improvement in Twine, of which the following
5 is a specification.

Twine is used very extensively in self-binding reaping-machines; but the twine often loses its strength in consequence of fermentation and mildew, engendered by moisture
10 when the grain is stacked, so that the binder-twine breaks in subsequent handling. This is especially the case with twine made of jute; hence more expensive materials have been employed for the binder-twine.

15 The object of my invention is to render the twine mildew-proof, so that it will not be materially weakened by the heat and moisture to which it is exposed when used for binding grain, and at the same time the strength of the
20 twine when made from jute is equal, or nearly so, to twine of the same size made in the ordinary manner from more expensive material. This part of my invention relates to the twine as an article, the process of making the same
25 forming the subject of a separate application, Serial No. 257,242, filed December 7, 1887.

In the manufacture of binder-twine it has heretofore been usual to employ a twisted strand of manila or sisal hemp, the fibers of
30 which are long and strong, in order that the required strength may be obtained and the twine may pass easily through the eye in the self-binding machine.

I make use of jute in the manufacture of my
35 twine, and I spin the same in strands or threads, and for binder-twine I use a sufficient number of strands to obtain the required strength without the twine being too large for the self-binding machine in which it is to be employed,
40 and I render the twine mildew-proof by a solution of mildew-proof material, such as alum, sugar of lead, or other known mildew-proof

material, and strengthen the twine by a weak solution of glue or size, which causes the fibers to adhere together more or less, and thus prevent the comparatively short fibers of the jute drawing away from each other. I thereby obtain the ultimate breaking strength of the fibers. It is preferable to pass the strands or threads through the solution of adhesive material and through the mildew-proof solution,
50 and allow the same to soak into the strands or threads uniformly, and then lay the strands or threads together to form the twine.

In carrying out my improvement the strands
55 or threads are by preference spun in the usual manner; then they are wound upon a warp or yarn beam, and then the layer of strands is passed through the sizing solutions and the surplus size squeezed out by rollers, and then
60 the strands pass through the mildew-proof solution, the surplus is squeezed off by rollers, and the strands pass through a drying room or apparatus and are wound upon a warp-beam. When this is full, it is removed and the
65 strands taken off in groups of the proper number each and twisted or laid up, as usual, into twine.

If a sizing and a mildew-proofing solution are combined, then only one vat will be required.
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I claim as my invention—

A twine of jute sized to strengthen the twine, and prepared with a mildew-proof composition to prevent the twine becoming injured
75 by heat and moisture while around the grain, substantially as set forth.

Signed by me this 6th day of September, A. D. 1887.

JAMES LYALL.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.