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1,978,103

STRAW MAT

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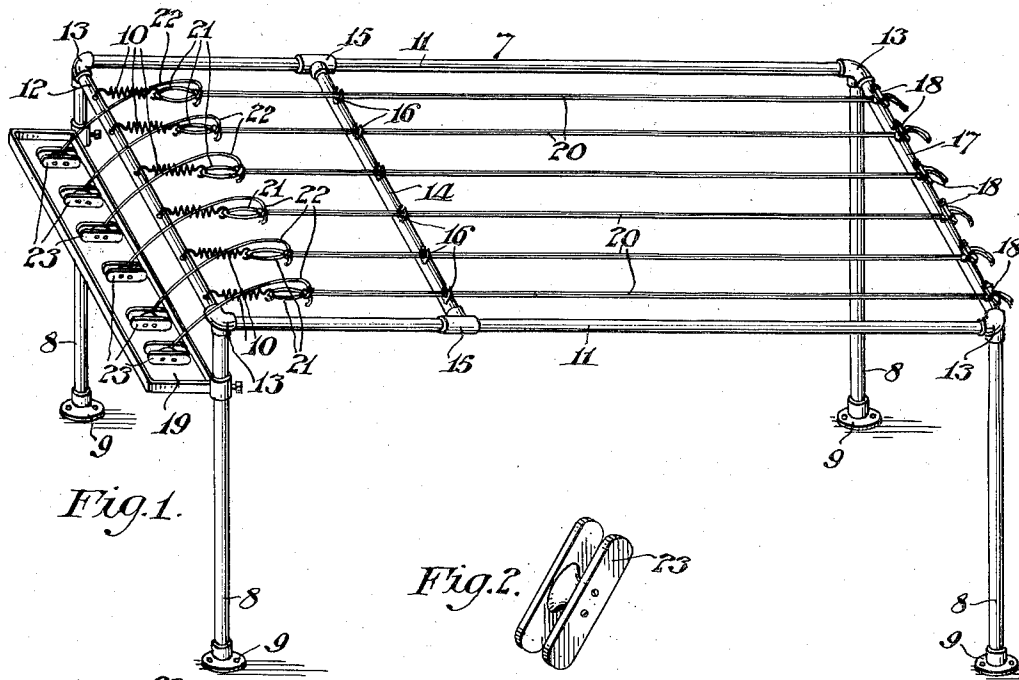


Fig. 1.

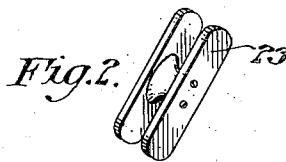


Fig. 2.

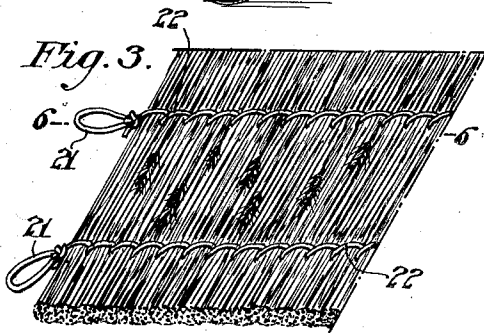


Fig. 3.

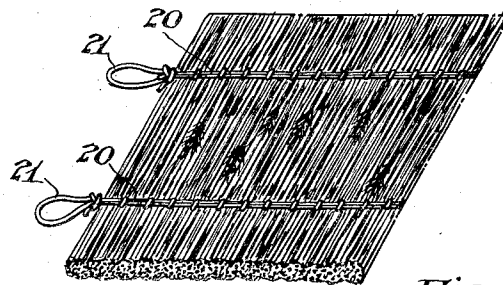


Fig. 4.



Fig. 5.

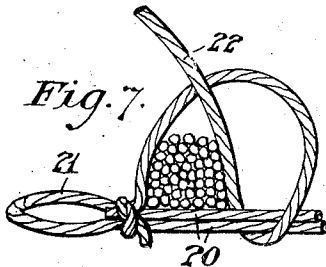


Fig. 6.

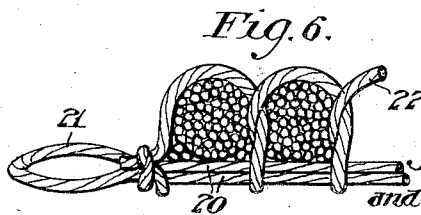


Fig. 7.

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UNITED STATES PATENT OFFICE

1,978,103

STRAW MAT

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signor to said Croasdale

Application October 15, 1931, Serial No. 568,936

9 Claims. (Cl. 28—1)

The invention relates to improvements in straw mats for wind-breaks, cold frame covers and the like, or for any form of covering for which it may be adapted. These mats are light in weight, strong and durable and especially resistant to weather conditions.

They are preferably made of full length rye straw.

In accordance with this invention the mat comprises a plurality of relatively small bundles of stalks of straw having where desirable the heads of the stalks overlapping in the middle of the mat. The stalks are held together in bundles by a plurality of courses formed of parallel strands extending longitudinally in spaced relationship. Each course comprises an upper and lower strand in knotted relationship, while the strands are under tension. The said strands also hold the bundles in close association to form the mat.

The method consists essentially in assembling the stalks as above stated in bundles and when desirable with the heads overlapping so that the butts of the stalks form the outside margins. The bundles so formed are laid transversely upon a series of parallel strands preferably of strong weather resisting fiber, held in evenly spaced parallel lines under spring tension, so that when an upper strand is brought around the bundle and over hand knotted with the under strand the tension exerted by the spring upon the strands reacts to cause tension upon the bundle embracing strands as hereinafter more fully described.

Referring to the drawing, which illustrates merely by way of example suitable means for effecting the invention;—

Fig. 1 is a view in perspective of a suitable frame for use in connection with the manufacture of the mat.

Fig. 2 is a view in perspective on an enlarged scale, of a bobbin to be used in connection therewith.

Fig. 3 is a view in perspective of one side of a portion or fragment of the completed mat.

Fig. 4 is a similar view of the other side.

Fig. 5 is a view on an enlarged scale of a portion of a bundle before applying the strands thereto.

Fig. 6 is a fragmentary section on line 6, 6 of Fig. 3.

Fig. 7 is a similar view, showing the tying operation.

Similar numerals refer to similar parts throughout the several views.

As a convenient means for use in manufacturing the mat, we have shown, in Fig. 1, a rectangular

frame 7. This frame is shown as made, for example, of suitable tubing, sleeves and elbows. The frame is supported at its four corners on vertical legs 8, each leg provided at the bottom thereof with flanged foot piece 9, for securing to the floor. This makes a very firm and rigid structure. The frame 7 is for example six or more feet long, and three or more feet wide for a mat of approximately corresponding dimensions. At the left hand end of frame 7, I have shown a series of helical springs 10 spaced about six inches apart, and three inches from the side rails or bars 11. These springs 10 may be conveniently secured in holes drilled in the end bar 12. A cross-bar 14, is secured to the sleeves 15 which are adapted to slide on the side bars 11 from one end to the other of the frame 7. The sleeves 15 are preferably provided with anti-friction means for facilitating their movement upon the side bars 11. This cross-bar 14 is provided with a number of eyelets or guides 16 spaced apart correspondingly with the springs 10. The end bar 17, at the other end of frame 7, is provided with a number of securing means 18, such as cleats or hooks. These cleats are similarly spaced apart, with respect to the springs and eyelets.

At the left hand end of the frame 7, and about six inches below the top plane thereof, is secured the flanged shelf 19. This shelf may be conveniently secured to a pair of the uprights or legs 8, and made adjustable thereon if desired.

Cords or strands 20 are provided, at one end, with loops 21 which are connected to hooks at the free end of the springs 10. The strands 20 are then threaded or otherwise engaged in the corresponding guides 16 and the other ends of said strands are secured to the cleats 18, at the right hand end of the frame 7. In connecting the strands to elements 18 the springs are brought under as nearly as possible equal tension, so that all the strands 20, when so connected, will have approximately equal tension. The strands 20 may be made of any suitable flexible material. We have found strands of strong weather resistant twisted fiber to prove satisfactory, and the knots made in connection therewith have a tendency to hold their positions during the process of manufacturing the mat.

Secured to these strands 20, at or adjacent the loops 21, are other strands 22, preferably about three times as long as strands 20. Each strand 22 is wound upon a separate spool or bobbin 23, which is manipulated by the operator. Each bobbin is of sufficient size to hold the required amount of strand 22.

We have found that when a strand 20 breaks, it is liable to become disengaged from several of the knots but that when a strand 22 breaks the adjacent knots tend to hold the balance of said strand in place. We therefore prefer to make strands 20 of double ply, or comprising two cords.

In operation.—Two operators are advantageously employed, one on each side of the frame, each operating on three courses. The bobbins 23 are conveniently placed in proper order upon the shelf 19. Each operator takes a component part of a bundle of straw, measuring, when slightly compressed, about three quarters of an inch in diameter at the butts, and places it upon the strands 20 parallel with end bar 12 and close to the loops 21, thus forming a single bundle with the head ends of the stalks overlapping. The butts of the stalks should project beyond the side bar 11.

Each operator then takes up the third bobbin 20 from his side, passes it over the bundle, then under the corresponding strand 20 and makes an overhand knot of strand 22 with strand 20, pulling it tightly against the side of the bundle thus compressing the same. There is also a slight yielding of the spring 10 in response to the pull in this operation, which reacts when the knot is completed, and tends to hold the same in position until the next bundle is pulled into place.

The function of the spring is thus two-fold. It prevents excessive strain upon the strand, and serves as a take up to hold the knot tight when completed.

It will be noted from an inspection of Fig. 7, that the strand 22 is passed over the straw bundle, then under the strand 20 and then through the loop thus formed. When the free end of strand 22 is pulled tight, the loop is contracted to compress the straw bundle. The strand portions cross each other on each side of each loop, as shown in Fig. 6, and are firmly clamped together between adjacent portions of the compressed straw bundles. As the strands sink partially into the straw, it follows that said crossing portions are practically embedded in the straw under pressure and are thus locked in position not only during the operation upon the next succeeding straw bundle but after completion of the fabric.

Thus, even in case a strand should be broken or severed at any point in the completed fabric, the locking engagement of the strands on each side of each bundle prevents or retards disintegration of the fabric.

Upon the completion of the operation just described, the second remote bobbins are similarly operated with their corresponding strands 20, and then the last bobbin which is nearest to each operator. When the first bundle is thus secured between the strands 20 and 22, the operation is repeated with succeeding bundles until the desired length of mat is completed. The guide bar 14 is kept as close as convenient to the bundle being operated upon, in order to keep the strands 20 evenly spaced throughout the operation. As the operation upon each bundle is completed, the forward margin of the bundle should be approximately parallel with the cross-bar 14, and when there occurs a variation from the parallel line, the operator soon learns to add to, or diminish his portion of the succeeding bundle, sufficiently to maintain said parallelism. When the last bundle is secured in place the strands 20 and 22 are further secured together with a square knot.

The edges of the completed mat overhanging the side bars 11 are then trimmed to a smooth

straight edge by shears, machine saw or other cutting tool most suitable and convenient for the purpose. The mat is now completed and may be removed from the frame.

It will be noted that this mat is composed of a number of parallel bundles of straw, the stalks of each bundle being bound together at a plurality of separated points, by upper and under strands knotted together between each bundle, and that the bundles are held in close association by the said strands.

It will also be noted that the strands 20 upon one side of the mat are substantially straight, while the strands 22 on the other side, form arches over and around each bundle and are looped or knotted to the straight strands, as indicated in Fig. 6. The points of engagement of the arched strands with the straight strands form convenient pivot lines which facilitate the flexure of the mat.

What we claim is:—

1. The method of making straw mats, which consists in placing bundles of straw stalks upon and across a plurality of parallel strands, held under substantially equal tension, bringing other strands over the bundle and each under a corresponding first strand, knotting one strand with the other and drawing the knot to compress the bundle, repeating the operation with succeeding straw bundles until the required length of mat is completed.

2. The method of making straw mats, which consists in forming bundles of straw stalks with their head ends overlapping at the middle part thereof and placing said bundles upon and across a plurality of parallel strands held under substantially equal spring tension, bringing other strands over the bundle and each under a corresponding first strand, knotting one strand with the other and drawing the knot to compress the bundle, repeating the operation with succeeding straw bundles until the required length of mat is completed.

3. The method of making a straw fabric, which consists in placing a bundle of straw upon and across a plurality of parallel strands, bringing other strands over the bundle and engaging each over-strand with an under-strand with a slip knot and drawing upon the knot to compress the bundle so that the pressure of the bundle will react upon the crossed portions of the over-strand, and repeating the operation with succeeding straw bundles until the required length of fabric is completed.

4. A straw fabric, comprising a plurality of straw bundles and securing strands arranged on opposite sides thereof and transverse the stalks of straw, the strands on one side being curved to embrace the bundles, and engaging the strands on the other side with slip knots between the bundles, whereby the stalks of each bundle are bound together under compression and the bundles are secured together in fabric forming relationship.

5. A straw fabric, comprising a plurality of straw bundles and securing strands arranged on opposite sides thereof and transverse the stalks of straw, the strands on one side curved to embrace the bundles, and engaging their respective strands on the other side with overhand slip knots between the bundles, whereby the stalks of each bundle are bound together under compression and the bundles are secured together in fabric forming relationship.

6. A straw fabric, comprising a plurality of

straw bundles and securing strands arranged on opposite sides thereof and transverse the stalks of straw, the strands on one side maintained substantially straight and in the plane of said side, while the strands on the other side are curved to embrace the bundles, and engage the straight strands with slip knots between the bundles, whereby the stalks of each bundle are bound together under compression and the bundles are secured together in fabric forming relationship.	opposite sides thereof, the cords on one side conforming substantially to the plane of said side, the cords on the other side being curved and embracing each bundle and engaging their respective cords on the opposite side by means of slip knots between the bundles, whereby the stalks of each bundle are bound together at separated points under compression, and the bundles are secured together in fabric forming relationship.	80
7. A straw fabric, comprising a plurality of straw bundles and binding cords arranged on opposite sides thereof, the cords on one side being curved and embracing each bundle and engaging the cords on the other side by means of slip knots, so that portions of the curved cords are crossed between the bundles whereby the stalks of each bundle are bound together at separated points under compression, and the bundles are secured together in fabric forming relationship.	9. A straw fabric, comprising a plurality of straw bundles, and binding cords arranged on opposite sides thereof, the cords on one side being plural strand, the cords on the other side being curved and embracing each bundle and engaging their respective plural strand cords by means of slip knots between the bundles whereby the stalks of each bundle are bound together at separated points under compression, and the bundles are secured together in fabric forming relationship.	85
8. A straw fabric, comprising a plurality of straw bundles, and binding cords arranged on	JOHN P. CROASDALE, JR. JOHN ARTHUR ROBERTS.	95
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