

G. A. LOWRY.

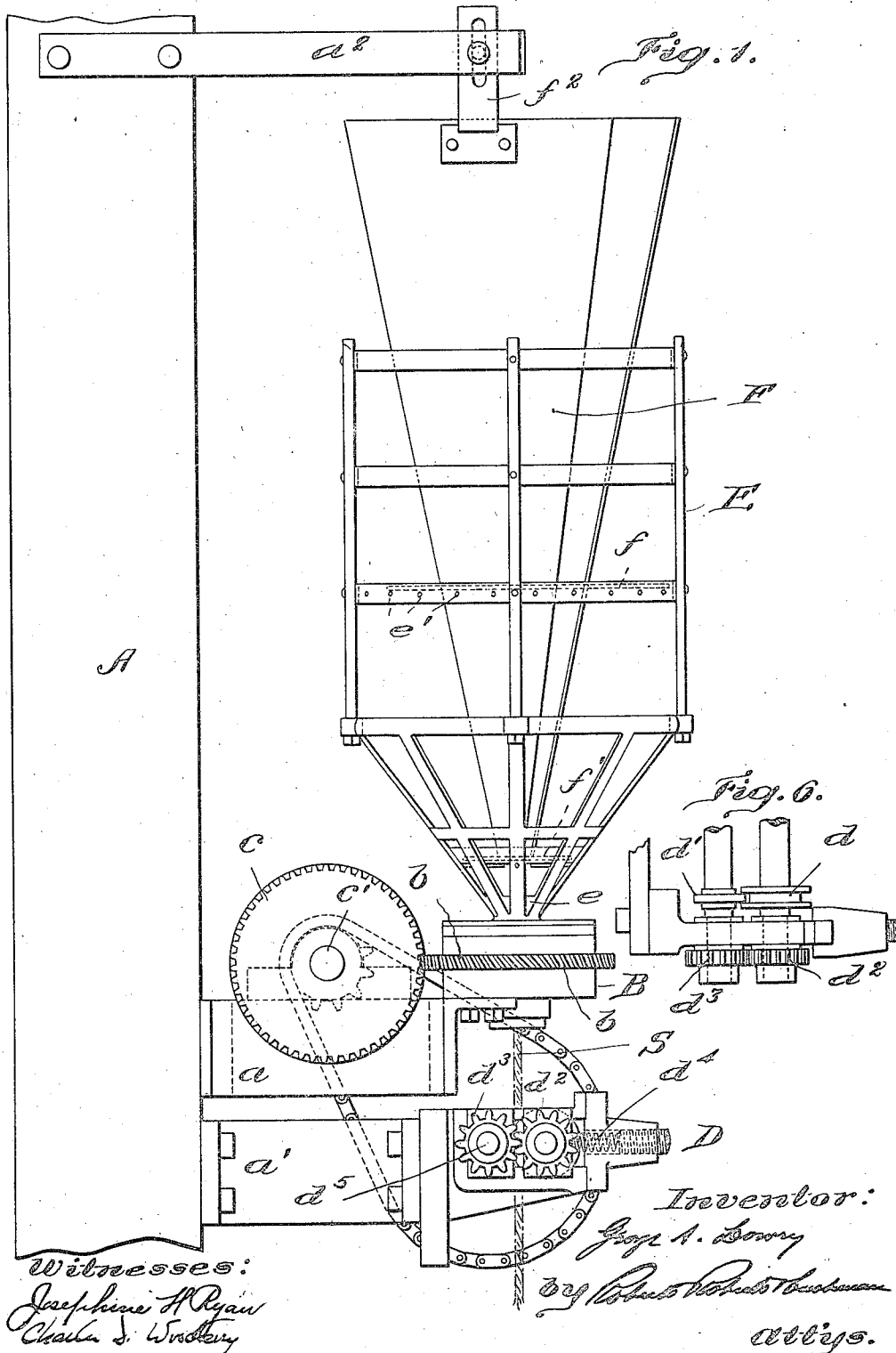
MACHINE FOR SPINNING AND TWISTING FIBERS.

APPLICATION FILED MAY 19, 1913. RENEWED APR. 28, 1915.

1,150,137.

Patented Aug. 17, 1915.

2 SHEETS—SHEET 1.

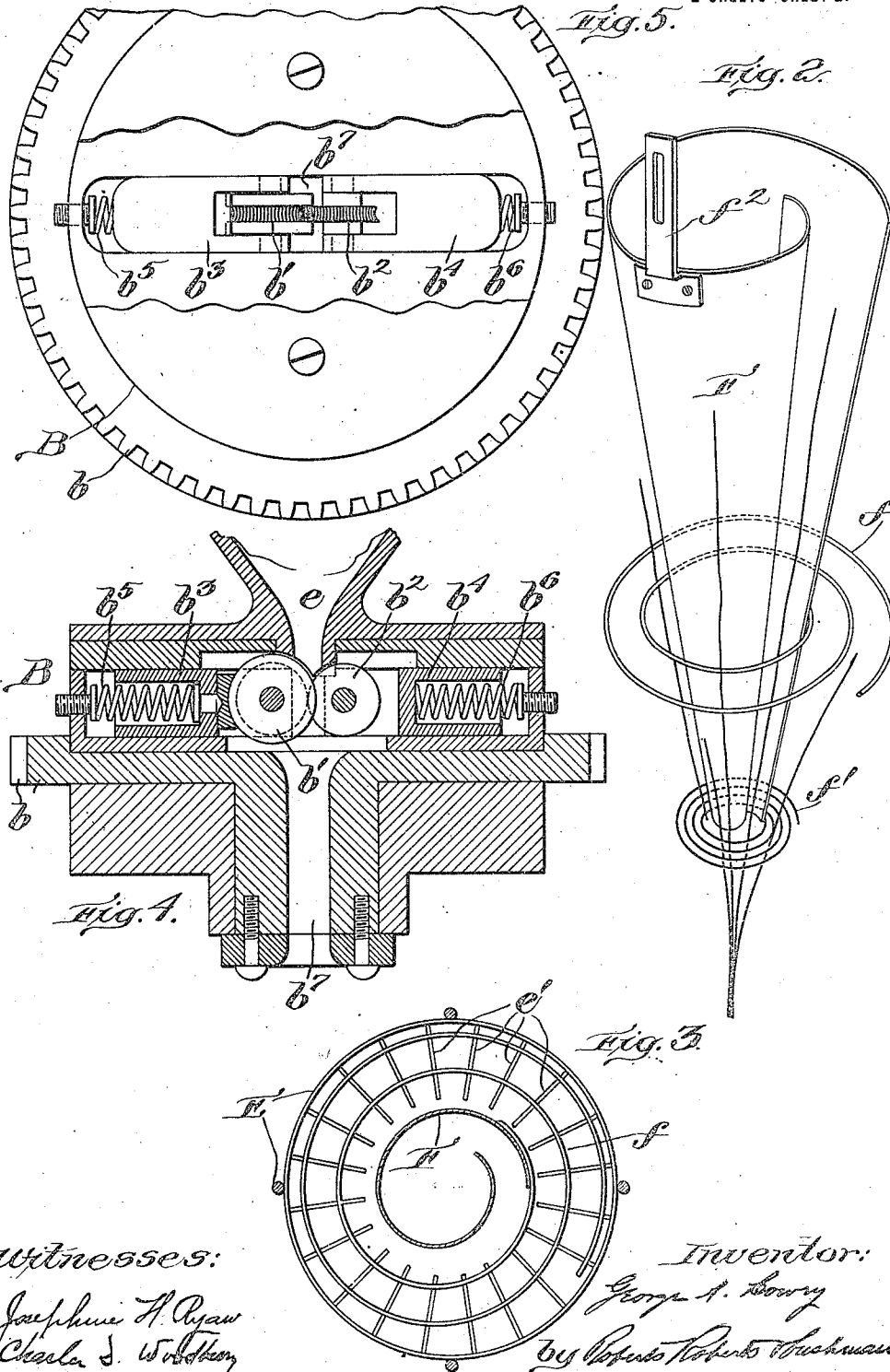


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UNITED STATES PATENT OFFICE.

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MACHINE FOR SPINNING AND TWISTING FIBERS.

1,150,137.

Specification of Letters Patent.

Patented Aug. 17, 1915.

Application filed May 19, 1913, Serial No. 768,573. Renewed April 28, 1915. Serial No. 24,576.

To all whom it may concern:

Be it known that I, GEORGE A. LOWRY, citizen of the United States, and resident of New York, in the county of New York and State of New York, have invented new and useful Improvements in Machines for Spinning and Twisting Fibers, of which the following is a specification.

This invention relates to spinning or twisting fibers, grasses, hairs, fine splints, strips or ribbons of the leaves of the palmetto or other trees, and materials of similar character, to all of which the general appellation of filaments may be applied, and its principal object is to produce a twisted strand of such filaments free from projecting ends of the individual filaments which compose the strand.

In the ordinary methods of spinning and twisting, the fibers, after being carded to place them in an approximately parallel relation to each other, are first loosely twisted together, and then by a series of drawing and twisting processes the fibers are drawn within the twist until a fairly smooth single twist strand is produced. The leading and following ends of the individual fibers, however, still protrude to a greater or less extent from the twisted strand, but when the fibers are fine, such protruding ends are not especially objectionable, or may be removed by gassing the strand or yarn. In twisting coarse strips or ribbons, to which this invention is particularly addressed, such as grasses, strips or ribbons cut from palmetto leaves, and similar materials, much difficulty has been experienced in obtaining smooth twisted strands, on account of the protruding ends of the comparatively stiff and coarse material.

In making twine or yarn of grass, strips, or ribbons of leaves, or similar coarse filamentous materials, for matting, binder twine, etc., it has been usual to make a multiple strand, composed of several single strands twisted together, each single strand being produced by a single twist method. The several single strands when wrapped around each other in a multiple strand hold down a substantial part of the protruding ends of the strips or filaments, but the multiple strand so produced is often undesirable for several reasons. It possesses too great rigidity and inflexibility; it is more costly than a single strand; and it requires more

time, labor and mechanism to produce it. It has also been a practice in making single strand twine of such materials to wrap the strand after it is twisted, with a cotton thread to hold down the protruding ends of the strips.

Neither of these expedients need be resorted to in practicing my invention, by which both ends of the several filaments or strips entering into the twisted strand are inclosed or enveloped by the mass of twisted filaments or strips themselves, so that there are no protruding ends. In making a twine or yarn from grass or other coarse fiber, according to my invention, I cause the filaments, as they are fed to the twister in succession, to spread or diverge at their following ends, while the leading ends are inserted into the center or core formed by the filaments previously fed to the twister. Roughly speaking, I make the filaments form a skeleton cone, with its apex at the point where the filaments are twisted together, and insert each filament so that its leading end enters the interior of this cone, joining the preceding filaments at the apex, and therefore at a point where the entering or leading end is inclosed by the preceding filaments as they are twisted together. As soon as a filament is thus introduced and its leading end twisted inside the previously introduced filaments, the free, or following end of the filament is caused to follow a helical path outwardly from its position of introduction; successively introduced filaments follow each other in this spreading movement, forming the skeleton cone into which the leading ends of the successively introduced filaments are passed. As the filaments are introduced in succession their following ends arrive in succession at the extreme outward position after following the said helical path, and just before these following ends are drawn into the twister, they are released from the guidance which determined their said helical movement, and spring inward to the center, or axis, of the skeleton cone. Then those filaments which follow, being still held in divergence from the axis of the cone, and being meanwhile drawn into the twister, twist themselves around the following end of the filament that has just sprung inward to the axis of the cone. This happens to all the filaments in succession, so that the leading end of each is wrapped inside the filaments

which preceded it in passage to the twister, and the following end of each is wrapped inside the filaments which succeed it in passage to the twister.

5 While the foregoing expresses my invention in its full values, a measurable portion of these values may be secured by so twisting the filaments together that one end of each is covered into the twine, leaving the other to lie at the outside, or where-
10 ever it may chance to be incorporated in the twine. Thus, both ends of the filaments are inclosed and held within the twisted yarn, which is therefore free from protruding ends, or one end only may be
15 so inclosed.

For performing the aforesaid new method of twisting and manufacturing the above described new article of manufac-
20 ture, namely, the twine or strand characterized as aforesaid, I have invented a machine, apparatus or mechanism, one embodiment of which is shown in the accompanying drawings, wherein—

25 Figure 1 is a side elevation of such machine; Fig. 2 is a perspective view of the spiral guide or spreader; Fig. 3 is a cross section through the parts shown in Fig. 2; Fig. 4 is a vertical central section, enlarged, through the twister; Fig. 5 is a
30 plan view, partly broken away, of the parts shown in Fig. 4; and Fig. 6 is a detail in plan view of the feed rolls or drawing rolls and their gears, shown in Fig. 1.

Referring to the drawings, A represents an upright support, to which are secured the brackets a , a' and a'' for supporting the various parts of the twisting mechanism. The twister, indicated generally at
40 B, is mounted to rotate on bracket a , and comprises the worm gear b , and a pair of pinch rolls b' and b'' , mounted respectively on sliding journal blocks b^3 and b^4 , which are pressed inward by springs b^5 and b^6 . The rolls b' and b'' meet across a central aperture b^7 through which the strand passes. The twister is rotated by a worm gear c , on shaft c' , journaled on bracket a .
50 Below the twister B, is the feed mechanism or drawing mechanism, indicated generally by the reference character D, supported on bracket a' , and comprising a pair of feed rolls d , d' , rotated together by gears d^3 , d^2 , which are carried by the shaft on which said feed rolls are mounted. A spring d^4 tends to press roll d toward roll d' .

The shaft c' may be connected with any suitable source of power (not shown) and drives not only the twister B, but also the
60 feed rolls d , d' by a chain and sprocket connection between shaft c' and the shaft on which roll d' is mounted.

On top of the twister B, and rotating therewith, is a hopper or carrier E, which

may be an open-work or cage-like structure, as shown, composed of upright bars and horizontal hoops. The sides of carrier E converge toward the bottom to a narrow throat e opening into the central aperture
70 of the twister B. Pins or arms e' project radially inward from one of the hoops of carrier E for the purpose hereinafter set forth.

F represents a spiral funnel, and f a
75 spiral wire, coiling outward and continuing the spiral from the outer edge of the spiral funnel. The spiral wire f is located a substantial distance above the outlet end of the funnel F, and a similar but smaller spiral
80 wire f' is located at the bottom of the funnel. The funnel F is adjustably supported on bracket a'' by a slotted ear f'' .

The operation of the machine is as follows: Assuming that the twister B is revolving, and that a twisted strand S has
85 been started and is being drawn downward by feed rolls d , d' , while the twist is being put in between the pinch rolls b' , b'' and the feed rolls, the upper untwisted ends of the filaments still standing above the
90 throat e of the hopper E, will have been carried from the inner convolutions of the spirals toward the outer convolutions by the rotation of the twister and hopper, while the funnel and spirals remain station-
95 ary. This will spread said upstanding untwisted ends outward in a form which may be described as a skeleton cone. New filaments are now added one after another, by
100 being dropped into the funnel F. The leading end of each filament will be directed at first by the funnel F acting as a guide, into the midst of the spread filaments, or, in other words, into the axis of
105 the cone, and at once becomes engaged and drawn into the center of the twine or strand passing between and being formed by the pinch rolls b' , b'' . At the same time the rotary motion given by the twister, assisted
110 by the inwardly projecting pins e' , e' on the hopper or carrier E, carries each newly introduced filament around in the spiral path provided or prescribed by the spreader, consisting of the funnel F and
115 spiral wires f , f' , until such filament joins those on the outside of the funnel, where for the time being it forms a part of the hollow skeleton cone, or conically diverging group of filaments. When the follow-
120 ing end of the filament, which is continually being drawn downward, comes within a short distance of the twister, it is released from the lower coil f' of the spiral spreader, which is spaced a little way from
125 the twister, and being short and comparatively stiff, springs to upright position, thereby bringing the following end into the midst of the spread ends of the subsequent filaments or strips, so that the longer ends
130

of material which are coming after it will envelop and inclose such following end. Thus the machine will automatically produce a single-twist strand in which both the leading and the following ends of its several component strips are inclosed and wrapped inside of the strand, instead of protruding therefrom as they do when made by the methods and the mechanisms heretofore employed.

The principle on which the above described machine operates is as follows: Strips or filaments being fed successively endwise into the twister, are successively spread outward at their upper or following ends, so that these ends form a skeleton conical helix as they are drawn down through the twister. Each strip or filament is fed into the core or axis of this conical helix, so that the previously inserted filaments wrap around the leading end of the subsequently inserted filament. As each filament descends to the twister it is released from the constraint which previously bent it outward from the core or center, so that its following end springs back to the core or center and is there surrounded and concealed by the filaments which succeeded it in introduction to the machine. The leading end of each filament is thus twisted inside the filaments which preceded it, while the following end of each filament is twisted inside the filaments which succeeded it, in introduction to the machine. From the instant the leading end of a filament enters the twister of the machine the filament is bent outward more and more, in a spiral path, until just before the following end enters the twister, that end is released to spring back to the center, and inside of the conical helix formed by its successors. As the filaments suited to such treatment are approximately of even lengths, the resulting twine is composed of filaments laid in substantially regularly spaced succession.

What I claim and desire to secure by Letters Patent, is:—

1. In a twisting machine, a twister, a spreading device to spread the untwisted parts of filaments passing to the twister, and a guide to direct the leading end of each strip into the midst of the spread filaments, said spreading device adapted to permit the following ends of the several filaments to return to the midst of the spread filaments before being twisted therewith.

2. In a twisting mechanism, a twister, a spreading device comprising a spiral spreader adapted to deflect and spread the

untwisted parts of filaments outwardly from the center, and a guide to direct the leading ends of newly introduced filaments into the midst of the spread filaments.

3. In a twisting mechanism, a twister, a spreading device comprising a spiral spreader adapted to deflect and spread the untwisted parts of filaments outwardly from the center, and a guide to direct the leading ends of newly introduced filaments into the midst of the spread filaments, said spiral spreader being spaced from the twister to permit the following ends of the several filaments to return to the midst of the spread filaments before being twisted therewith.

4. In a twisting mechanism, a twister, a stationary spiral spreader adapted to deflect and spread the untwisted parts of filaments, introduced into the center of the spreader, from the center outward, a guide to direct the leading ends of newly introduced filaments into the midst of the spread filaments, and a rotatable carrier for moving said untwisted ends from the inner toward the outer convolutions of said spiral spreader.

5. In a twisting mechanism, a rotatable twister, a carrier mounted on and rotatable with said twister, a stationary spiral spreader adapted to deflect and spread the untwisted parts of filaments from the center outward, and a guide to direct the leading ends of newly introduced filaments into the midst of the spread filaments.

6. In a twisting mechanism, a rotatable twister, a stationary spiral spreader adapted to deflect and spread the untwisted parts of filaments from the center outward, a guide to direct the leading ends of newly introduced filaments into the midst of the spread filaments, a carrier mounted on and rotatable with said twister, comprising a hopper and arms projecting inwardly from the sides of said hopper, adapted to move said filaments in said spiral spreader.

7. In a twisting mechanism, a twister, and a filament-guiding and spreading device from which filaments pass to the twister, comprising a spiral funnel and a spiral wire guide, the inner end of which is connected to and forms a continuation of the outer edge of the spiral funnel.

Signed by me at New York, N. Y., this fifteenth day of May, 1913.

GEORGE A. LOWRY.

Witnesses:

JOSEPH OFFENBACH,
AARON GRABEY.