2 Sheets—Sheet 1.

C. WHIPPLE.

ROPE MACHINE.

No. 7,130. Patented Feb. 26, 1850.

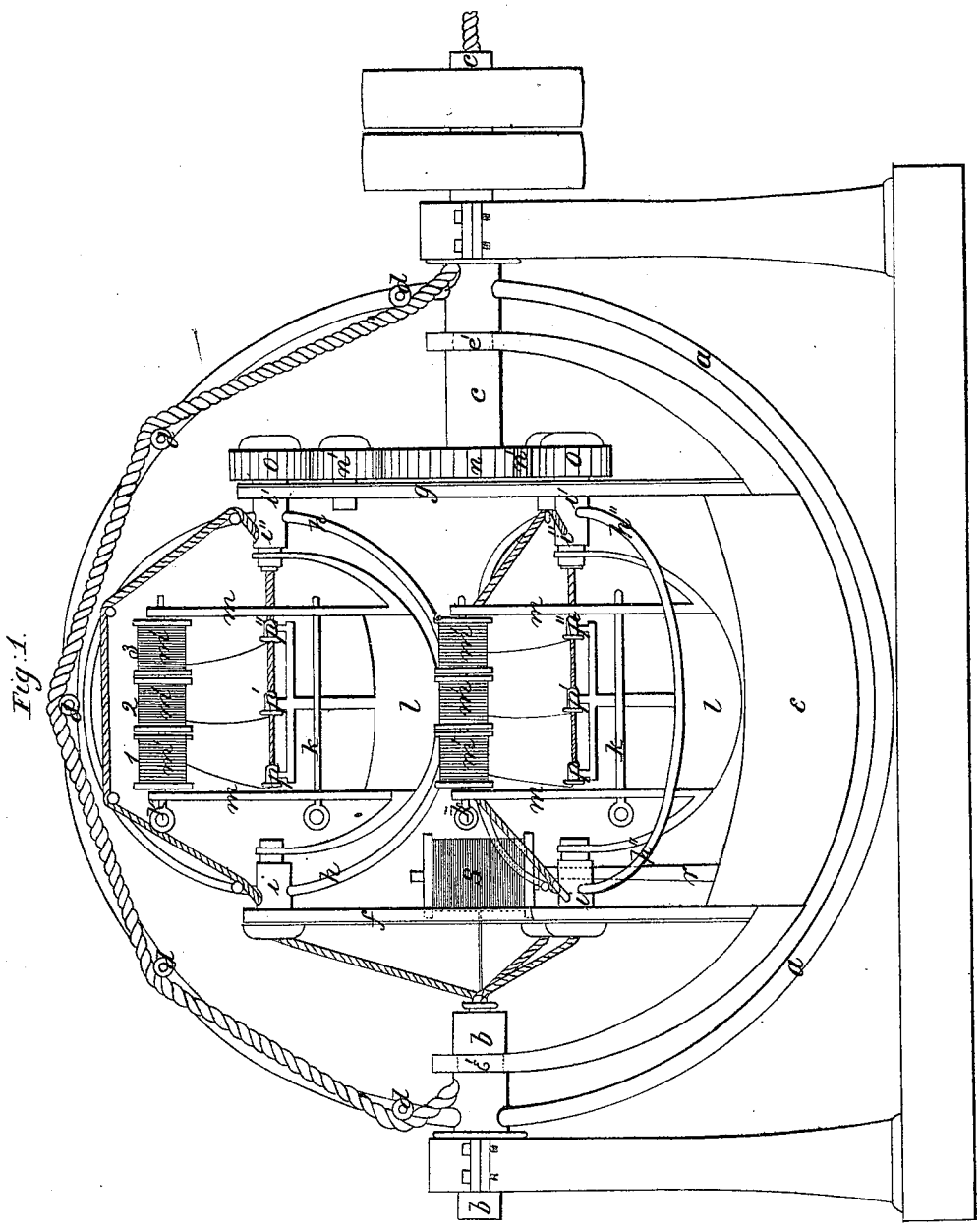

Fig. 1.

2 Sheets—Sheet 2.

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Fig. 3

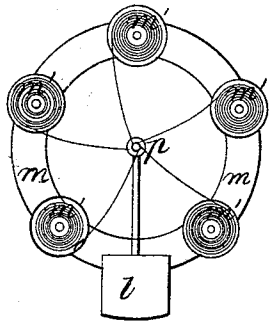


Fig. 4.

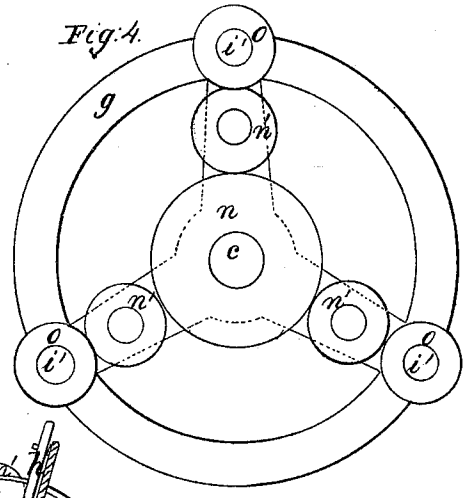
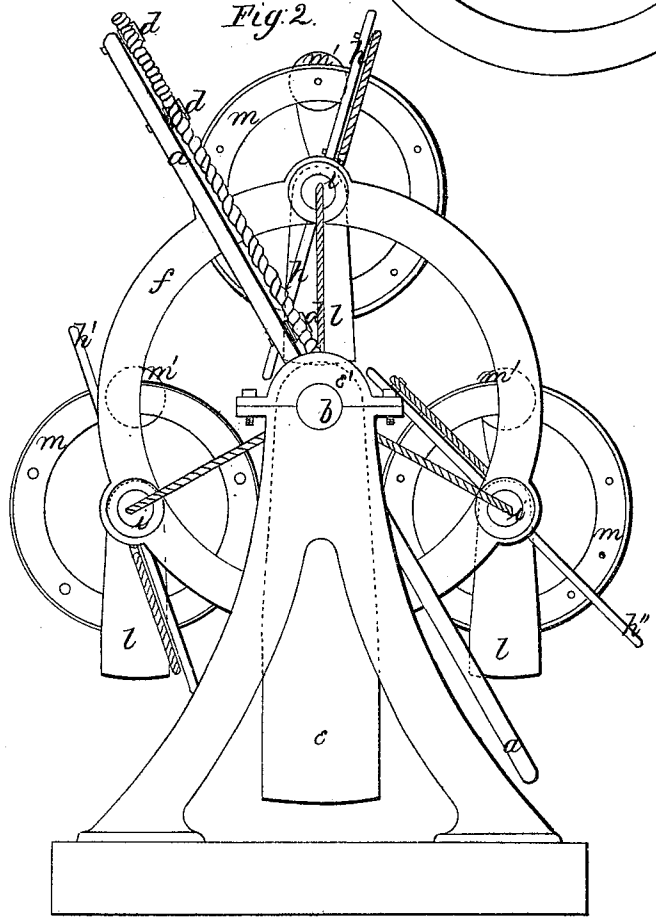


Fig. 2.



UNITED STATES PATENT OFFICE.

CULLEN WHIPPLE, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO JESSE CARPENTER.

MACHINERY FOR SPINNING YARN AND MAKING ROPE.

Specification of Letters Patent No. 7,130, dated February 26, 1850.

To all whom it may concern:

Be it known that I, CULLEN WHIPPLE, of Providence, in the county of Providence and State of Rhode Island, have invented a new and Improved Machine for Spinning Vegetable Fiber; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure I is a side elevation. Fig. II is an end elevation. Figs. III and IV are plans in detail.

Similar letters refer to similar parts in all the figures.

My invention consists in a machine for the manufacture of cordage, which is also applicable to the manufacture of all kinds of materials from vegetable fiber which require to be formed into twisted threads or yarns; and the novelty of my machine consists in the peculiar manner of laying the said fibers, and the twisting of them, whereby each and every fiber composing any cord is made to bear its exact proportion of strain to resist fracture under tension. In cordage as manufactured under the old process, this result is not attained, for it is well known that in all such cordage the exterior strands are required to sustain the principal part of the strain, as may be easily proved by applying very gradually sufficient force to break the rope, when the outside strands will be seen to part first. In my invention the method of tubing, or forming the strands, is such that an exact parallelism, and equal strain, is insured in each thread composing it, and this is carried on from the core to the outermost thread.

A second feature of my machine, is the method of giving a double twist, first of all, to the strand itself, and secondly, to the rope while laying the strands.

The means I employ to obtain the results above named, consist of a train of mechanism, so contrived as to put in revolution a number of metal rings, upon which the stock is delivered as fast as prepared, and which is from these conveyed to other rings as the work progresses to completion.

At (*a*) is represented a large cylindrical ring, which for strength and other advantages, I make of metal. This ring is attached from two of its sides, and directly in a line running horizontally through it, to two short hollow shafts (*b*, *c*,), said attachment being effected by flanges to which the ring is screwed, or by welding directly to the end of the shafts, as may be thought best. These shafts rest upon standards terminating in pillow blocks, fitted to receive their journals. On the shaft (*c*) there is a pulley to receive a belt for driving it and also a pinion of common construction which gears into a wheel for driving the reeling machinery, to be more fully explained hereafter. Around the circumference of one half of the ring (*a*) there are attached several small sheaves or guides (*d*), properly grooved to convey off the cord received from the interior rings. The shafts (*b*, *c*) extend also a short distance within the ring (*a*) and serve as bearings to sustain an interior frame, upon which rest the primary rings, and their attachments. At (*e*) is seen the lower part of the interior frame, which consists of a semicircular piece of metal, whose radius is less than that forming the ring (*a*), it terminates at each end in eyes (*e'*), fitted so as to play upon the shafts (*b*, *c*,) as shown. At the lower part much greater weight is given to it than at the eyes, the object of which is to prevent it from being carried round with the shafts (*b*, *c*,) when they are put in rotation, by the friction of the parts in contact; and this weight must also be sufficient to counterpoise the weight of the bobbins, and primary rings which rest upon it.

The primary rings with their bobbins are next introduced in the machine. These are sustained upon two hoops (*f*, *g*,) affixed to the bail (*e*) at their circumferences and at right angles to it. They are also placed at such distance apart as to give the necessary room to insert the primary rings as seen in the drawings. These hoops are set in such a position, that their centers are on the centers of the shafts (*b*, *c*,). In the hoop (*g*) three arms are attached which join in the center, and divide the hoop into three equal compartments; the use of which, is to support the several trains of wheels which propel the primary rings, as will be hereafter more fully described. The three primary rings (*h*, *h'*, *h''*,) are next suspended on the hoops (*f*, *g*,). They are constructed much in the same manner as the large ring (*a*); two short hollow pivots (*i*, *i'*,) are affixed to each of them, as shown; by these they are suspended in the hoops (*f*, *g*,) the pivots passing through proper holes in the

same; in the hoop (*g*) the pivots come through at those parts opposite to the terminations of the three arms before named, and consequently are equidistant from each other; the opposite hoop (*f*) is pierced for the other three pivots in like manner. The pivots (*i*, *i'*,) extend inside of the rings a short distance and terminate as journals. On each of these journals a semicircular bail, or hoop (*l*, *l*, *l*,) is hung very similar to the large bail (*e*) before described, and like it they are all weighted on their lower parts to prevent them from rotating with the friction of the revolving pivots (*i*, *i'*). On each of these bails (*l*) two hoops (*m*) are affixed precisely in the same manner as those mentioned at the letters (*f*, *g*,) on (*e*); the use of these hoops is to support the bobbins, which hold the stock from which the cordage is formed. Around the sides of the hoops (*m*) as many holes are made as there are to be rows of bobbins. And the bobbins run upon pins (*k*) passing through these holes from hoop to hoop. The distance each hoop stands apart is sufficient to receive several bobbins on a pin; in the drawing each pin has three bobbins (*m'*) upon it. And there are five rows around each hoop. It may be remarked here that other standards than hoops, can be used to hold the bobbins, neither is it necessary to confine myself to this number of bobbins but on the contrary I constantly vary them to suit different kinds of work. The primary rings have also on one of their sides a row of small pulleys, or sheaves, similar to the large ring, to be used for conveying off the strand as it is formed from the bobbins.

I now return to describe the gearing for giving motion to the primary rings. These all receive motion from one wheel placed at the center of the hoop (*g*) this wheel represented at (*n*) is keyed on the end of the shaft (*c*) and receives motion from it; it also rotates in unison with the ring (*a*); each of the pivots (*i'*) passes through the hoop (*g*) sufficiently to allow of the pinion wheels (*o*) to be keyed to them and these are connected to the wheel (*n*) by intermediates. The sizes of the pinions is such as to revolve with greater speed than that of (*n*) which speed is to be varied to adapt itself to work different kinds of stock. In Fig. 4 an end view is given showing the whole connection clearly. A set of intermediate wheels is used in order that the primary rings may rotate in the same direction as the large ring (*a*). The next feature connected with the primary rings is the tubes for forming the strands. These tubes are composed of metal and have an interior opening sufficiently large to receive all the lines collected from the several bobbins. The letters (*p*, *p'*, *p''*,) show the tubes in their proper positions; they are held in place on a horizontal bar which is sustained by a vertical post rising from (*l*); the tubes are also in line with the center of rotation of the primary rings. In forming the strand (which consists of several layers) a series of threads from the tier of bobbins No. Fig. 1 are passed through the tube (*p*, *p'*, *p''*,); next from the tier of bobbins No. 2 a like number are passed through the tubes (*p'*, *p''*,) these forming a layer over the first. Tier No. 3 is next treated in the same way passing the threads through (*p''*) outside of all. The threads thus collected form one of the strands of the rope as yet untwisted. They are then all taken together and put into the end of the hollow pivot (*i'*) and passed on through the bore of the same until it is brought out at the side opening at (*i''*). Thence it is passed round so as to lie on the little sheaves or guides placed on one half the ring (*h*) and thence through the opposite hollow pivot (*i*). The tubes on the other two primary stands being filled in like manner and brought to the same place furnishes the three strands of which a rope is made. The materials of the three strands thus collected are all to be put through the bore of the hollow shaft (*b*) at the rear end of the machine; thence they are passed over the shears (*d*) placed on the large ring (*a*) and thus carried to the opposite shaft (*c*), through which they are also put in the manner shown in the figures. From the end of this shaft the perfectly formed rope is carried to the reeling machine, which being of common construction a particular description is not deemed of importance at this place.

Up to this point I have described merely the manner of erecting my machine, and the method of putting the stock upon it preparatory to operation. The stock placed as just described, exhibits merely a mass of fine lines brought all together from the various bobbins to the place of final delivery at the end of the shaft (*c*). The manufacture of perfect rope will now take place by simply putting the shaft (*c*) in rotation. It will now be perceived that the stock is not put in motion, that is, carried from place to place, to effect the twisting, but remains quiescent. All the parts being now in motion it will be seen that the primary rings are in rapid revolution around their several sets of bobbins. The reeling machine also commences drawing off the rope as it is formed and the twisting process is going on throughout the machine.

I have stated that the twist I give by my machine is peculiar, and it consists in giving a double twist to each individual part composing the rope, and also to the rope itself. This is effected by the peculiar action of the rings. By means of the primary rings

the threads from the several bobbins are twisted as they are collected through the tubes (p, p', p'',). Two distinct twists are put in by each ring; the first twist at the place where the threads come first upon it, as at (i''), and the second twist at the place where it leaves it, as at (i); thus a full twist is put in at each end, at every complete revolution. The effect of the first twist is to cause each layer of the threads as they are collected in the tubes to be wound one upon another, and thus each thread is made to draw or bind upon the other with equal tension. The second twist is given at the outlet (i) and this is for the purpose of more perfectly hardening and combining the strand previous to laying it into rope. The laying of the strand into rope is now effected by bringing the large ring (a) into action. All the strands being brought together are thrust into the hollow shaft (b) and passed over the ring (a) and out at its opposite side through (c) as before described. The principle for laying or twisting the strand into rope by the large ring is the same as that produced by the primary rings, giving two twists in the same manner at each revolution of the shaft (c). The rope is now formed and nothing more is to be done but reeling it. The process of which is effected on a machine of common construction.

It may be proper to give various degrees of hardness to rope according to the service it is to perform. Accelerating the speed of the reel will diminish the hardness of the rope by putting lest twist in a given quantity. And diminishing the speed will increase the hardness of the rope by the contrary action, putting more twist in less length.

To manufacture shrouding or that kind of rope which has a central strand or core by this machine, it is only necessary to prepare a reel of the proper sized strand; this is then to be put upon a spindle (r) placed vertically on the bail (e) a short distance in front of the opening in the shaft (b) as shown at (s) Fig. 1, and the strand being then inserted along with those received from the primary rings, those will be laid or formed upon it in the manner shown.

What I claim as of my own invention and desire to secure by Letters Patent is—

1. Giving to the strand during the operation of spinning a double twist to each revolution of the rings or fliers in the manner described herein, the same being applicable to, and claimed in the spinning of yarns from any fibrous material, and also in laying the strand into rope in the manner set forth.

2. I claim the combination of the weights (l) and (e) with the bobbin stands for the purpose of preventing those from being carried around with the rings or fliers, the whole being arranged and operated substantially in the manner and for the purpose herein described.

CULLEN WHIPPLE.

Witnesses:

JOSEPH P. PIRSSON,

ED. B. UNDERHILL.