(No Model.)

F. WOODS.
Rope Making Machine.

No. 235,839. Patented Dec. 21, 1880.

Fig: 1.

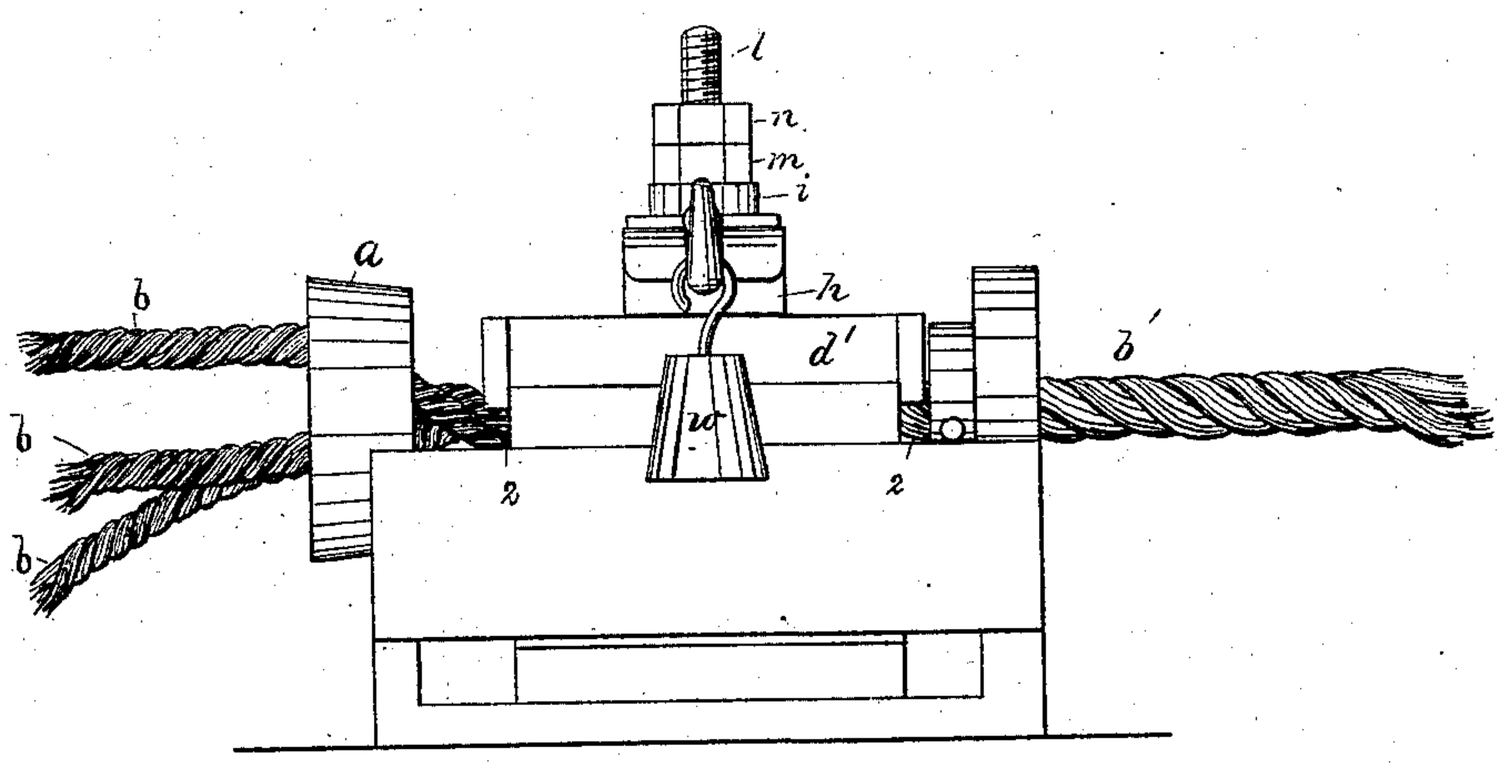


Fig: 2.

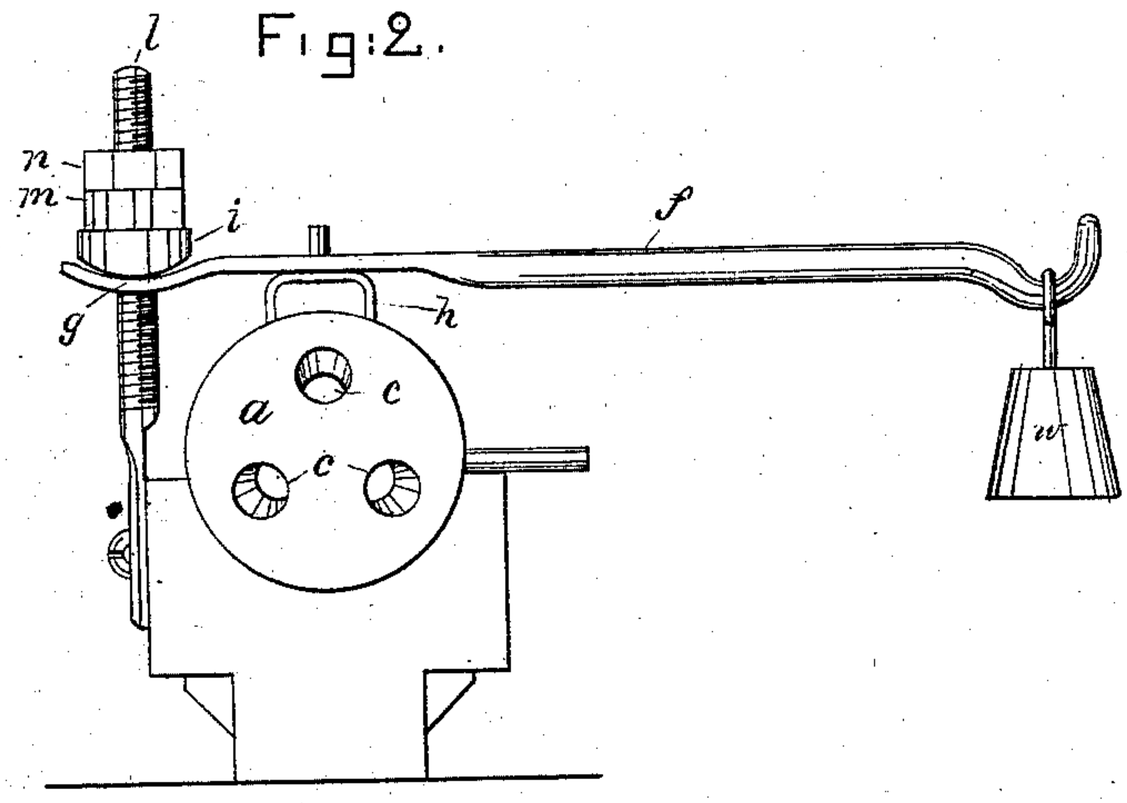


Fig: 3.

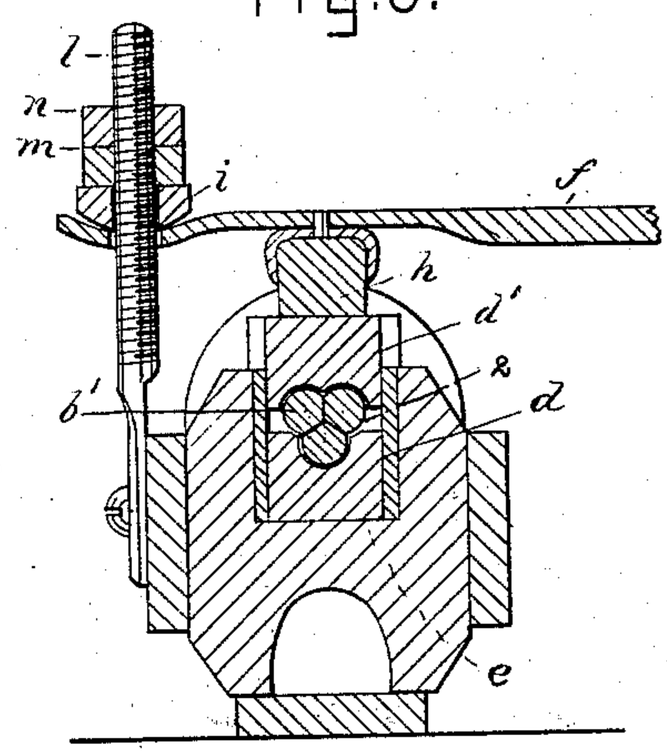


Fig: 4.

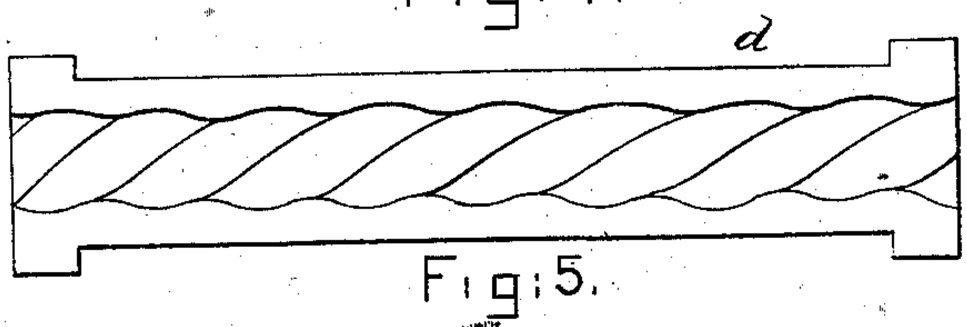
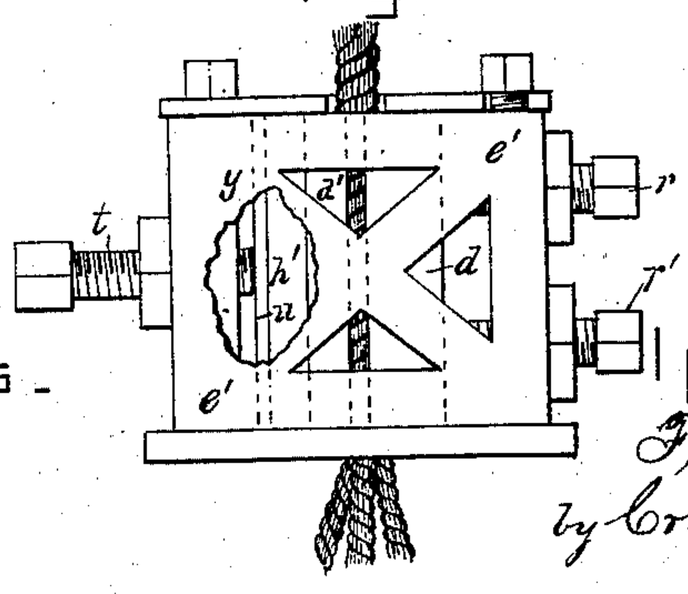


Fig: 5.



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UNITED STATES PATENT OFFICE.

FRANCIS WOODS, OF BOSTON, MASSACHUSETTS.

ROPE-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 235,839, dated December 21, 1880.

Application filed September 18, 1880. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS WOODS, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Rope-Making Machines, of which the following description, in connection with the accompanying drawings, is a specification.

My invention relates to machines for making rope; and it consists in the combination, with the usual machinery for twisting or laying the strands of the rope, of what I term an "after-turn tube." This tube is formed in two portions, being divided longitudinally, and is shaped on its inside to correspond with the lay or twist of the strands of the rope, it having spiral corrugations fitting the surface of the finished rope. After the strands of the rope have been properly twisted or laid together in the usual way the said rope is led through this after-turn tube, the two portions of which are pressed tightly on the rope between them, so as to rub with considerable or with a regulated amount of friction thereon, and by the action thereof the lay of the rope is rendered uniform, the rope is compacted, and the superfluous loose fibers are rubbed off, giving the rope a uniform size and finished and glossy appearance.

In that form of rope-making machinery where the whole rope is twisted while being drawn through stationary forming mechanism the after-turn tube will usually be horizontal, its lower portion being supported in a suitable bed, and the upper portion will be pressed down thereon by a weighted lever having an adjustable fulcrum located at one side of the said tube and adapted to support a weight at its extremity on the other side of the said tube. The lever bears at an intermediate point upon the upper portion of the said tube a suitable bearing-block of flexible material, such, for instance, as india-rubber, being connected with the under side of the said lever in proper position to rest upon the said tube.

In that form of machine in which the laying mechanism revolves about the rope a weighted lever cannot be used to give the requisite pressure between the parts of the after-turn tube, and in this instance a spring or elastic pressing device will be used. The tube is in this case carried in a frame which revolves about the rope, and one portion of it rests against unyielding set-screws, which can be properly adjusted to bring the axis of the tube in proper position to coincide with the axis of the rope, while the other portion of the tube is pressed toward the unyielding portion by a set-screw and spring, or block of rubber, or other elastic device, interposed between the tube and the said set-screws, to enable the tube to yield or open slightly should any irregularities occur in the rope.

Figure 1 is a side elevation of a sufficient portion of a rope-making machine to illustrate my invention; Fig. 2, an end elevation thereof; Fig. 3, a cross-section thereof through the middle of the pressure-lever; Fig. 4, a face view of one portion of the after-turn tube, showing its parallel corrugations, which correspond to the lay of the rope, the said figure being on a larger scale than the others; and Fig. 5, a side elevation of a corresponding portion of a rope-making machine, in which the tube revolves about the rope.

The top *a*, having guide-openings *c*, through which the strands *b* of the rope are led from suitable reels, and the machinery for laying the strands and forming the rope, may be of any usual construction. After the strands *b* have passed through the top *a* and been twisted or laid upon one another, they are led through the after-turn tube, (shown as made of two portions, *d d'*,) the inside whereof, through which the twisted rope passes, being grooved, as shown in Fig. 4, to correspond with the lay of the rope, and fit closely upon the twisted strands thereof. I make these tubes in the following manner: A piece of wood of suitable shape to form one portion of the tube is provided with a longitudinal groove somewhat smaller than the diameter of the rope, and spiral diagonal grooves corresponding to the strands of the finished ropes are cut therein to fit as nearly as possible all parts of the said rope. The said wooden tube is then placed in the position that the finished tube is to occupy in the machine, and a considerable length of manufactured rope is passed through it, the two portions of the tube being pressed firmly against the said rope, which will wear and polish the inner surface of the tube, so that it will accurately fit the strands of the

finished rope. The said wooden tube, or that portion thereof, is then used as a pattern by which similar tubes of cast-iron or other suitable hard material are made, which are then used, as shown at *d d'*, in the rope-making machine. The lower portion, *d*, of the tube rests in a suitable groove in the bed *e*, and the upper portion is placed in the said groove above the rope *b'*, and is pressed down thereon by a suitable pressure device. A space, 2, is left between the adjacent edges of the two portions of the tube, so that they bear wholly upon the rope, instead of on one another.

The pressure device in the form shown in the first three figures consists of a lever, *f*, having its fulcrum-point *g* at one end, and provided with a weight, *w*, at its other end, while at an intermediate point it carries a bearing-block, *h*, preferably of elastic rubber or other yielding substance. As the two portions *d d'* of the tube wear under the constant action of the rope passing through the tube the bearing-block *h* and the weight *w* will descend, and the lever *f* will assume an inclined position. In order that it may maintain a proper bearing at its fulcrum-point when thus inclined, its rear end is made or shaped to fit against a curved fulcrum-piece, *i*, so that the bearing, when the lever is considerably inclined, remains substantially the same as when it is horizontal.

The curved fulcrum-piece *i* fits loosely over a threaded stem, *l*, and is held in place by the nut *m* thereon, a check-nut, *n*, preventing the nut *m* from loosening. The fulcrum-piece *i* may be adjusted by screwing down the nuts *m n* from time to time, as the portions *d d'* of the tube wear, and the lever is thus allowed to fall below a horizontal position.

In the form shown in Fig. 5 the tube is vertical, and a weight cannot be used to give the desired pressure on the two portions of the tube. In this instance or modification the tube is held in a frame, *e'*, and the fixed portion *d* thereof rests against the set-screws *r r'*, by which it can be moved laterally and its position be properly adjusted in the said frame *e'*. The other portion, *d'*, of the tube is pressed toward the portion *d* by the set-screw *t*, a bearing-block, *h'*, of elastic material, as soft rubber, or a spring, being interposed between the said set-screw and the portion *d'* of the tube. When soft rubber is used a plate, *u*, of iron or other rigid material is used to transmit the pressure of the said screw *t*, and in such construction the sides *y* of the frame *e'* are made to rest against the bearing-block, of rubber, to prevent it from yielding in a lateral direction.

Rope made in a machine provided with my invention is nearly one-sixteenth smaller in diameter than the rope made from the same strands without this improvement, and it has a hard polished surface, almost entirely free from the short ragged fibers which are commonly seen in new manila rope.

I claim—

1. An after-turn tube for rope-making machines, it having its internal surface provided with spiral corrugations, as shown and described, to fit the strands of the twisted rope, whereby the rope passing therethrough in the process of manufacture receives a uniform lay and has its surface finished, substantially as described.

2. An after-turn tube for rope-making machines, it being divided longitudinally and having its interior surface spirally grooved to fit the strands of the finished rope, combined with an adjustable yielding pressure device to press the said two portions of the tube against the rope, as desired, and allow the said tube to yield to correspond to any irregularities in the rope passing therethrough, substantially as described.

3. The after-turn tube consisting of two portions held in an adjustable bed, combined with a weighted lever and bearing-block operated by it to press one portion of the said tube against the rope between it and the other portion, and a curved fulcrum-piece, *i*, for the said lever being adapted to fit the said block, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANCIS WOODS.

Witnesses:
S. VANIER,
JOS. P. LIVERMORE.