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Improvement in Machines for Making Wire Rope

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Rope Machine

No. 92,870. Patented Jul. 20, 1869.

Fig. 5.

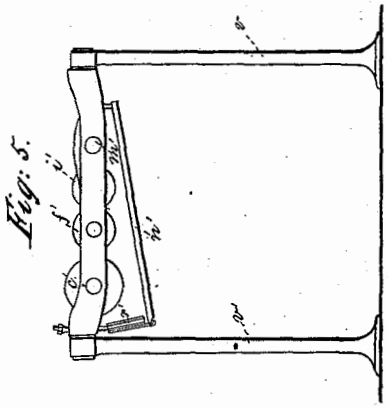


Fig. 2.

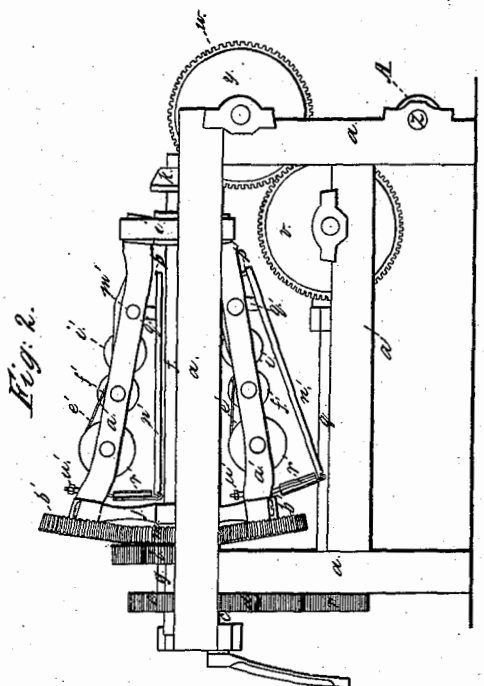


Fig. 1.

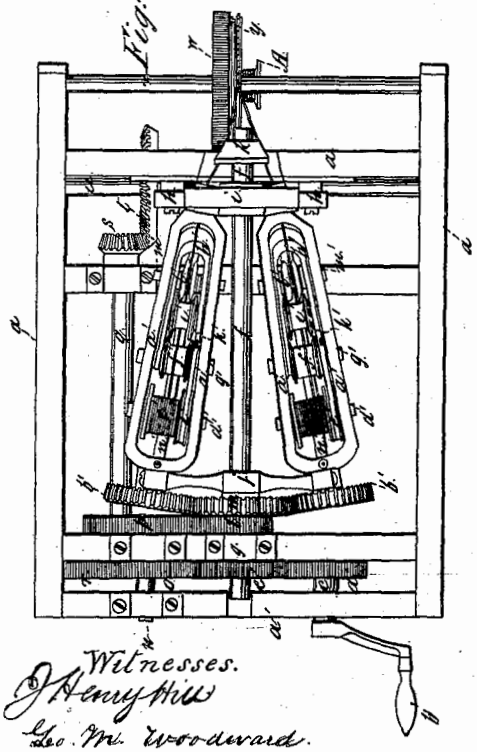


Fig. 4.

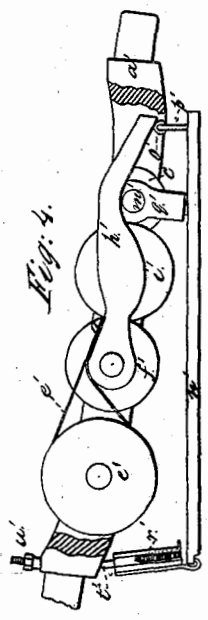
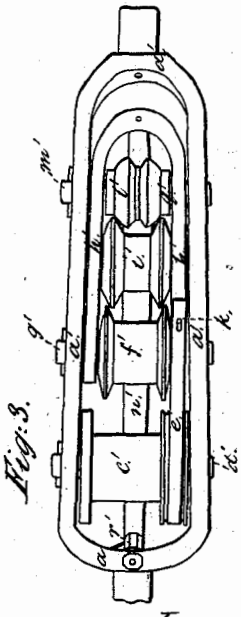


Fig. 3.



Witnesses.

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Letters Patent No. 92, *dated* July 20, 1869.

IMPROVEMENT IN MACHINES FOR MAKING WIRE ROPE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, CHARLES H. MORGAN, of Worcester, county of Worcester, and State of Massachusetts, have invented new and useful Improvements in Machines for Forming or Laying up Wire Rope; and I do hereby declare that the following is a full, clear, and accurate description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in giving to each strand or component part of a rope a uniform tension during the process of forming or laying up a wire rope, to accomplish which, I have organized a machine containing mechanism which I call a spool-carrier. Said carrier contains a spool of wire, and two or more grooved friction-rolls, over and around which the wire passes from the spool to the point for laying up the rope; also compound levers, friction-strap, or brakes, and spring-balances, as will be described.

These improvements will be fully understood by reference to the following specification, and the accompanying drawings, in which—

Figure 1 is a plan or top view.

Figure 2 is a side elevation.

Figure 3 is a plan of the spool-carrier, containing the mechanism to produce a uniform tension of the wire in laying up or forming the wire rope.

Figure 4 is a longitudinal vertical section of the same.

Figure 5 is a side elevation of the spool-carrier or frame, shown in figs. 3 and 4, supported upon standards, in position to furnish the machine with a wire or strand for a core for the rope, if one is desired.

a a a represent the frame-work of the machine, which supports the working-parts.

b is a crank, attached to the shaft *c*, having secured to it the gear *d*.

e is a gear, secured to the hollow shaft *f*, which passes horizontally through the centre of the machine, supported at one end in the box *g*, and at the other upon the friction-rolls *h h*, attached to the frame *a*, and flier-head *i*, attached to the shaft *f*. This shaft has also secured to it the flier-head *j* and the wire guide *k*, and, running loosely upon it, the gear *l*, which is fastened to the gear *m*.

n is a shaft, having secured to it the gears *o* and *p*.

q is a shaft, running parallel with the shaft *f*, and supported in the frame *a*, having secured to it the spur-gear *r* and the bevel-gear *s*, engaging with the larger bevel-gear *t*, upon the shaft *u*, running horizontally at right angles with the shaft *q*, and having also a spur-gear, *v*, upon it, which engages with the gear *w*, upon a parallel shaft, *x*.

y is a cylinder, having two or more grooves around it, and attached to the gear *w*.

z is a shaft, running parallel with the shaft *x*, and having upon it a bobbin or drum, A, suitable to contain the wire rope as it is finished by the machine.

a' a' are spool-carrier, which are supported in the flier-heads *i* and *j*, by journals, one of which is hollow, through which the wire passes.

The journal at the other end of the spool-carrier is solid, to which are attached the spur-gears *b' b'*.

c' is a spool of wire, supported and running upon the pin *d'*. Said spool has one broad head, with groove in it, to receive the friction-strap *e'*.

f' is a flanged roll, supported in the frame or carrier *a'*, upon the pin *g'*.

h' is a bow-shaped or forked lever, pivoted at its ends upon the pin *g'*, having in its centre the friction-roll *i'*, supported upon nicely-adjusted bearings or pivots, the frame or forked lever *h'* being so constructed as to move freely in the inside of the spool-frame or carrier *a' a'*.

e' is a friction-strap, of steel, or any suitable material, which passes around the grooved heads of the spools *c'*, both ends of the same being secured to the forked lever *h'*, by the pin *k'*.

l' is a narrow-grooved friction-roll, supported in the spool-frame or carrier *a'*, upon the shaft *m'*.

n' is a horizontal lever, attached at one end (see fig. 4) to the forked lever *h'*, by the eye-bolts *o'* and *p'*, having for its fulcrum, the shaft *m'* and projection *q'*, and at the other end, the nicely-adjusted spring-balance *r'*, the end of the lever resting upon the hook of the balance, the whole being supported and adjusted by the bolt *t'* and the nut *u'*.

If a core is desired for the rope, standards *v v* may be employed for supporting mechanism, similar to that in frame *a'*, and the journals of this spool-frame, carrying the core-strand, will be arranged in line with the hollow shaft *f'*, so as to deliver its strand through such shaft to be covered by the strands of the rope proper.

Having described the manner in which the several parts of my machine are arranged, I will now proceed to describe how the same operate together.

The spools *c'* being filled with wire, the ends of the wire are passed over the friction-rolls *f'*, under friction-rolls *i'*, over friction-rolls *l'*, and through the hollow journals of the spool-carriers and slots in the guide *k*, when the wires or strands are brought together, uniting with a wire or strand of hemp, to form a core, drawn from the spool-frame, (fig. 5,) through the hollow shaft *f*, provided the core-strand is used. The wires or strands are passed around the grooved pulleys attached to the gears *w* and *v*, and made fast to the spool A, on the shaft *z*, which receives the finished rope.

Having furnished the machine with wire, proceed to turn the crank *b*, attached to the driving-shaft *c*

which communicates motion to all the various shafts of the machine, by means of trains of gears connecting the shafts together.

The motion of the spool-frames *a' a'* is peculiar, inasmuch as they are supported upon journals in the flier-heads *i* and *j*, and pass around the hollow shaft *f*, the gears *b' b'* being engaged with the gear *m*, and the gears *m* and *l* are connected together, and run loosely on the shaft *f*, and make two revolutions to one of the shaft *f*, whereby the spool-carriers are made to revolve around the shaft *f*, in all positions keeping the same side up, the result of which is to lay the several stands of wire in the rope without twisting them.

In the process of rope-making, the strands are of unequal length, as it would be difficult to put strands of uniform length on the several spools. In case it could be done, it is not desirable to have the splicings of strands come at one place in a rope, therefore some of the spools will be nearly empty, while others are nearly full; and it has been found impossible to secure uniform tension. I have therefore invented a self-regulating mechanism to produce uniform tension on the strands of a rope, which operates as follows:

In order to draw the wire from the spool *c'*, the friction of the brake *e'* upon the head of the spool must be relieved. This friction is maintained by the action of the spring-balance *r'* through the levers *n'* and *h'*.

When a certain amount of force is applied to the wire strand, the lever *h'* is raised, by the strand passing under the friction-roll *i'*, attached to the lever *h'*, overcoming the power of the spring-balance, and relieving the spool from the friction of the brake *e'*, maintaining uniform tension upon the strand, regardless of the quantity of wire upon the spools.

The spring-balances are provided with adjusting-screw and nut, to adapt the machine to make large or small rope, it being obvious that small rope would require less tension than large rope.

Heretofore great difficulty has been experienced in producing good rope from wire, from the fact that wire is more rigid than any other material used in the manufacture of cordage, and that it cannot yield to unevenness of tension without great detriment to the strength of the rope, it being a well-known fact that in a rope of maximum strength, each of its component parts must bear its proportion of the strain applied to the rope.

I make no claim to the standards *v v*.

Having set forth the nature, construction, and operation of my invention,

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

1. The combination of the mechanism, herein described, constructed and operating substantially as set forth.

2. The spool-carrier with its adjustable brake, constructed and operating to produce uniform tension on the wire, substantially as described.

CHAS. H. MORGAN.

Witnesses:
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GEO. M. WOODWARD.