E. GUILE.

ROPE MACHINE.

No. 17,787. Patented July 14, 1857.

Fig. 3.

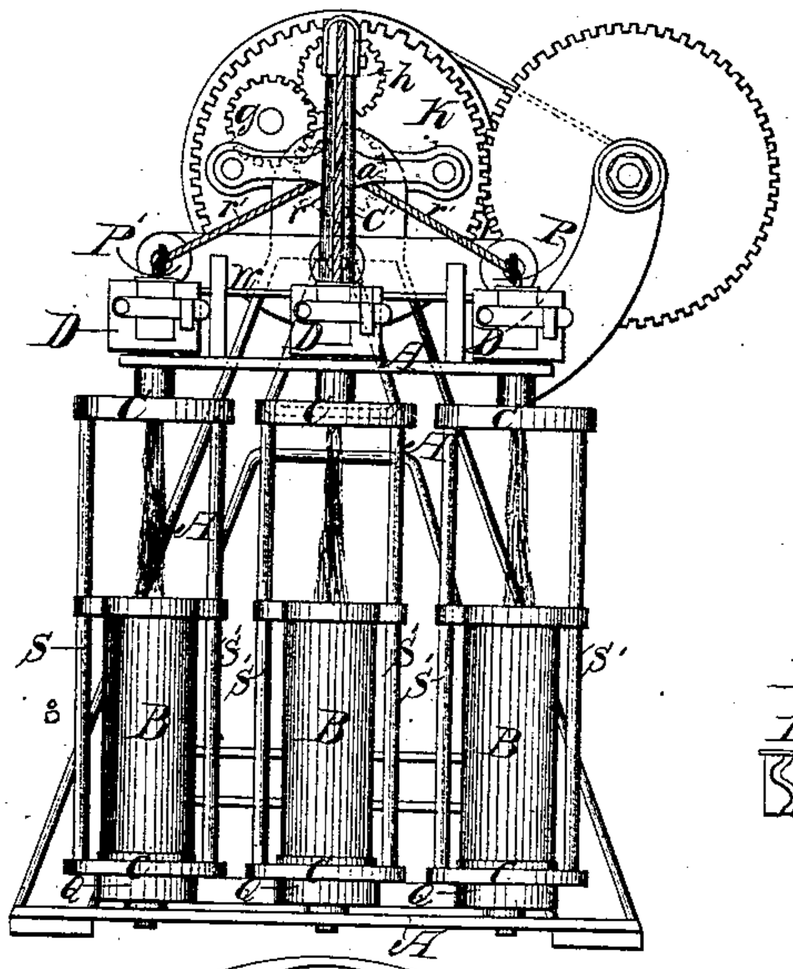


Fig. 6.

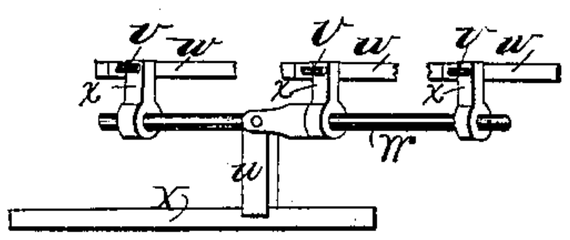


Fig. 4.

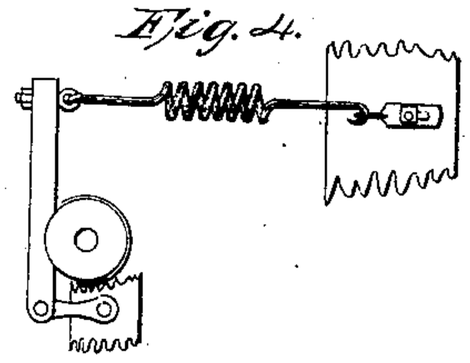


Fig. 5.

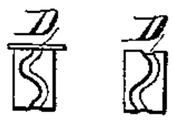


Fig. 1.

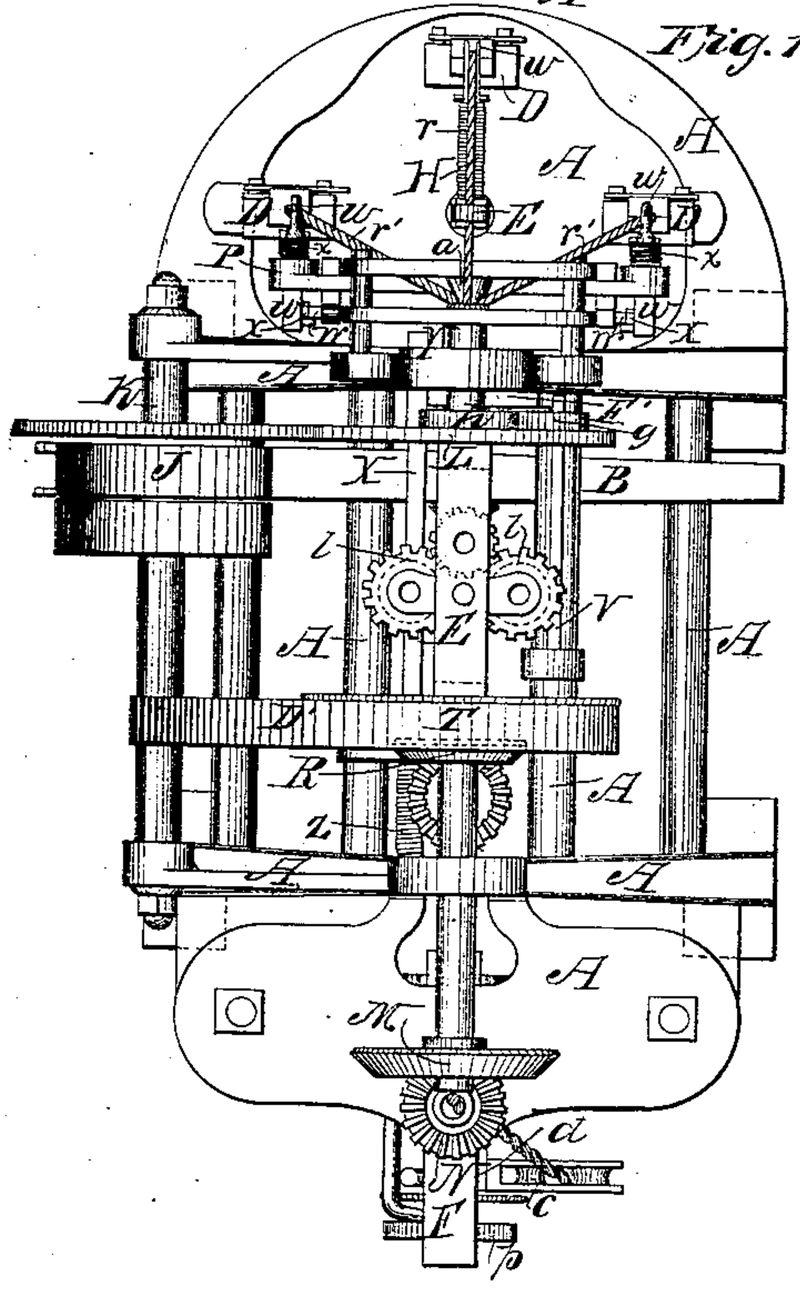
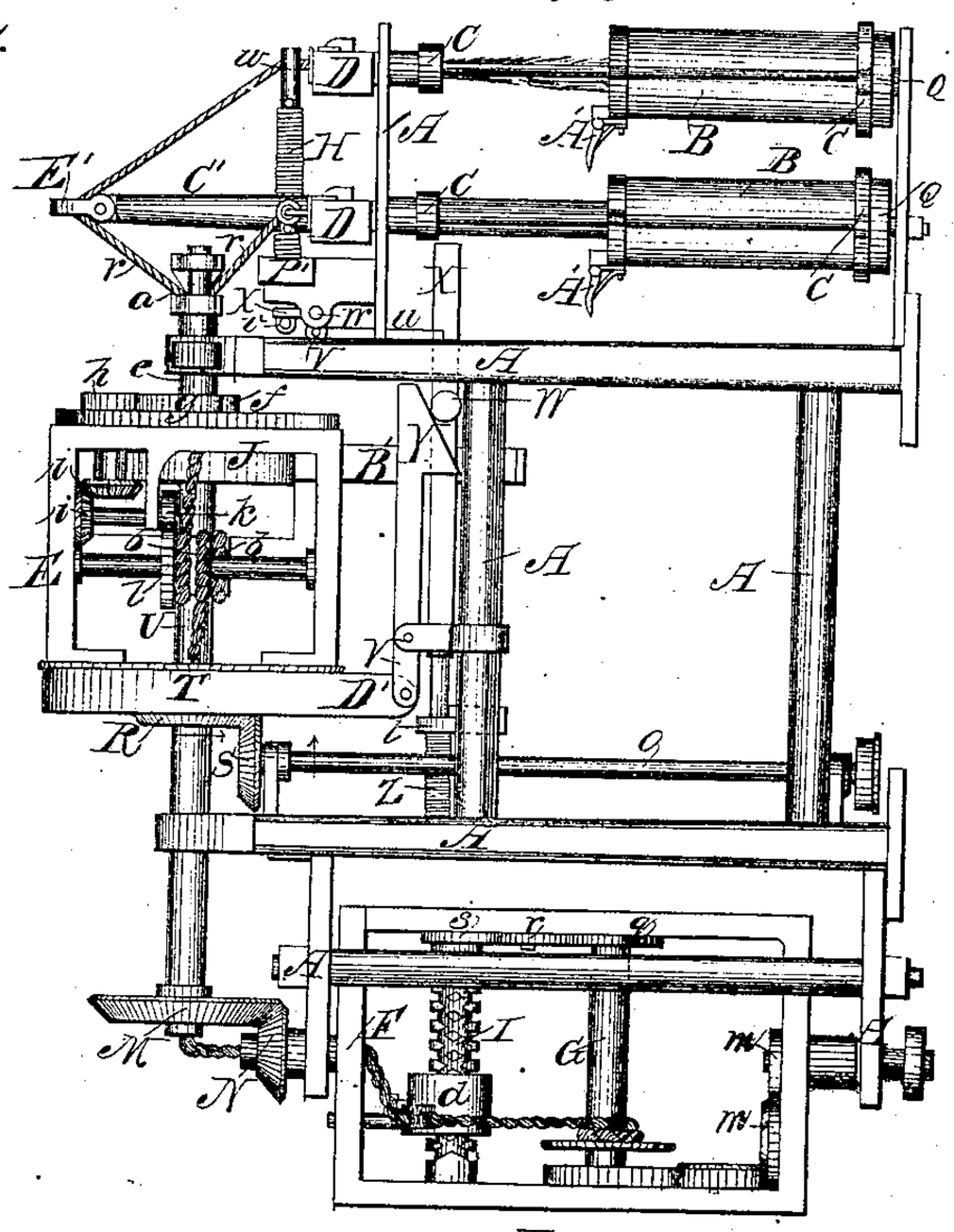


Fig. 2.



Inventor:
Ezekiel Guile

UNITED STATES PATENT OFFICE.

EZEKIEL GUILE, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN ROPE-MACHINES.

Specification forming part of Letters Patent No. **17,787**, dated July 14, 1857.

To all whom it may concern:

Be it known that I, EZEKIEL GUILE, of the city and county of St. Louis, and State of Missouri, have invented certain Improvements in Rope-Machines; and I do hereby declare that the following is 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 1 is a top view; Fig. 2, a side and Fig. 3 an end elevation.

My invention consists in improvements on the twisting and laying machine used in making rope from the "raw sliver." These improvements consist in the use of an additional laying-flier combined and operated as hereinafter described, and also of providing the machine with an automatic stopping apparatus, whereby it will stop itself in case one of the strands entering in the composition of the rope should break, and also in an improved construction of the twisting-heads, whereby the sliver will be held from slipping, made smoother, and will be more easily drawn from the cans.

To enable others to make and use my invention, I will proceed to describe the construction and operation of an ordinary spinning and laying machine with my improvements attached, and then point out the improvements, together with the advantages they are found to possess.

Similar letters represent corresponding parts on the different figures.

A A A A is the frame of the entire machine upon which all the working parts are placed.

B B B are the cans in which the "sliver" is deposited. These cans are fixed in the twisting-fliers C C C and revolve on their own axes. The sliver from the respective cans is drawn through the twisting-heads D D D, by which it is twisted in what is termed a "ready." These readies are carried forward through their respective guides, so as to converge and enter the laying-flier E at *a*, as shown. The twisting-heads D D D are made of two parts, each part having a curvilinear groove cut in its face, so that when they are put together the grooves correspond and form a curvilinear tube through the head, as shown at Fig. 5.

The readies having entered the laying-flier at *a*, as described, are laid in a rope and carried forward around the capstan-pulleys *b b* and through the axis of the flier E into the flier F, where they are regularly disposed on the bobbin G through the agency of the reciprocating traverse *d*, on which is fixed a sheave, over which the rope passes, (shown at *c*, Figs. 1 and 2,) and where it receives an additional twist.

On the axis of the flier E at *e* a small cog-wheel is placed, as shown in dotted lines at *f*, Fig. 3. This wheel meshes in a corresponding wheel, (shown at *g*,) which conveys motion to a third wheel, (shown at *h*,) and on the other end of the shaft of this third wheel a small miter-wheel is fixed, as shown at *i*, so as to mesh in a corresponding miter-wheel. (Shown at *j*.) On the lower end of the shaft upon which the wheel *j* is fixed there is a small pinion-wheel fixed, (shown at *k*,) which meshes in the two wheels *l l*, whereby motion is conveyed to the capstan-pulleys *b b*, which perform the duty of drawing the readies into the laying-flier as fast as required, and their velocity is regulated by the size of the wheel *g*, which is termed a "change-wheel," and may be removed at pleasure and its place supplied with a larger or smaller one, as the case may require.

H is a friction-wheel fixed on the lower end of the center about which the flier F revolves, and on the upper end of this same center a small cog-wheel is fixed, as shown at *m*, by which motion is conveyed to the bobbin G through the series of wheels *n o p*, and from the bobbin G motion is communicated to the endless screw I through the agency of the wheels *q r s*. The pulley H and the center upon which it is fixed may be prevented from turning by means of a friction-bar and spring, as shown at Fig. 4, or in any other suitable manner, so that the flier F in carrying the wheel *n* around the stationary wheel *m* gives the required motion to the bobbin and endless screw.

J is the driving-pulley, to which the power is applied, and from it motion is conveyed to the flier E through the cog-wheels K L, and the flier F receives its motion from the shaft of the flier E through the miter-wheels M N, and the twisting-fliers C C C receive their motion from the shaft O through the agency of a belt leading from the pulley P around the

pulleys Q Q Q on the fliers C C C. The direction of the belt is shown in red, and the shaft O receives its motion from the shaft of the flier E by means of the two miter-wheels R S, arranged as shown.

T is a friction-wheel fixed on the shaft of the flier E, and to it the flier is secured, so as to be substantially a part of it, and over this friction-wheel a friction-bridle is passed, one end of which is secured to the shaft U and the other to the end of the lever V, as shown at Fig. 2.

On the end of the lever V an inverted inclined plane is made, as shown at Y, which is acted upon by the roller W, which is placed on the end of an arm, (shown at F'.) This arm is fixed in a small square rod (shown at X) which works through and is guided by holes made in the frame to receive it, and is acted upon by the spring Z, one end of which bears against a pin fixed in the said rod and the other against a bracket fixed on one of the braces of the machine, as shown at *t*.

In the top of the rod X a notch is cut and in it the catch-bolt *u* is made to work. This catch-bolt is fastened to a small lever shown at V which is fixed on the shaft W, and on this same shaft and at right angles with the lever V there are three more levers placed, as shown at *x x x*, Fig. 6. These levers act against pins (shown at *v*) fixed in the end of each guide-rod of the respective readies. The guide-rods are shown at *w*, and each one of them has a spring around it, as shown at *x*, one end of which bears against a pin fixed in the said guide-rod and the other against the shoulder of the bar P', through which the rods work, so that a force applied to the end of them will compress the spring and allow the lever V on the shaft W to fall, so as to cause the catch-bolt *u* to drop in the notch cut in the rod X to receive it, when brought in the position shown on the drawing, to which it is brought by means of the belt-shifter B', which is secured to the said rod X, so that the action of the rod will govern the action of the belt-shifter.

The relative position of the shaft W, the levers *x x x* and V, together with the catch-bolt U, the rod X, and the guide-rods *w*, are shown at Fig. 6.

Now suppose the machine in operation, the readies, in passing from the twisting-fliers to the laying-fliers, as shown at *r' r' r'*, will draw hard against the ends of their respective guides, so as to compress the springs *x* and allow the catch-bolt *u* to drop in the notch cut in the bar X and hold the bar in that position so long as the readies remain unbroken; but should one of them break, the spring on the guide-rod will distend and cause the pin in the said guide-rod to act on the levers X and V, so as to detach the catch-bolt *u* from the rod X, which being acted upon by the spring Z will be thrown back, and the belt-shifter with it, so as to move the belt from the fast to the loose pulley and at the same time cause the roller W to act against the incline plane Y, which will cause the lever V to draw the bridle D' hard on the friction-wheel T, thus causing the machine to stop and prevent the end of the broken ready from being drawn in the laying-flier by the breaking of said ready.

In the top of the column C' a small sheave is placed, over which one of the readies pass, as shown, and over the top of this sheave a clevis or fender is fixed, as shown at E', so that in case the ready should break it will not be thrown into and entangled with those on either side.

The cans B B B are secured to the flier by means of a spring-catch, as shown at A', Fig. 2.

Having thus described the construction and operation of the foregoing machine, I have only to point out my improvements together with their advantages, which are, first, in the old machine the cans B B B are secured in the flier by means of a strap passed around them and fastened to the flier-bars S' S'; but with my improvement they are secured by means of the spring-catch shown at A', by which time is saved in changing the cans; second, in the old machine there is no clevis or fender fixed over the sheave in the top of the column C', so that when the ready breaks it is thrown into and entangled with the one on the right-hand side by the twisting of the flier D; but this objection is overcome by the use of the clevis or fender described in paragraph eighteen, because if the ready breaks between the laying-flier and column it will be prevented from falling on the other readies by the fenders, and if it breaks between the twisting-flier and column the ends will be too short to reach the other readies, whereby the machine will be saved from being broken from this cause; third, in the use of the old machine when one of the readies breaks the end is carried forward into the laying-flier and twisted into the body of the rope before the machine can be stopped. A bad place is therefore left in the rope, as the ready cannot be brought back and pieced; but my improvement overcomes this objection by the use of the automatic stopping apparatus described in paragraphs eleven to fifteen, inclusive, of this specification, whereby the machine is stopped the moment one of the readies is broken, so that it may be pieced before entering the laying-fliers; fourth, in the old machine the dies (shown at Fig. 5) in the twisting-heads D D D are made with a flat surface and have to be set up against the sliver hard enough to prevent it from turning by the friction produced by being so set up; but when the grooves in the dies are made as described in paragraph six the sliver will neither slip nor break, but will be made round and smooth before twisting, thus producing a smoother and better rope; fifth, the old machine has but one laying-flier. The bobbin G and the endless screw I, with the reciprocating traverse *d*, are fixed in the flier

E, which is made long enough to receive them, and all the laying is done by that flier, the rope being taken directly from the capstan-pulleys *b b* onto the bobbin. When this arrangement is used, the machine cannot be driven at high velocities, as it would be torn to pieces by the centrifugal force induced by the weight of the bobbin and rope, together with the endless screw and the other necessary machinery to produce the required movements; but by the use of the additional flier F the capacity of the machine can be increased to four times, for by placing the bobbin and reciprocating traverse in the said flier F the flier E can be driven to double the velocity, by which double the amount of rope will be laid in that flier, and if the size of the wheel *g* is increased, so as to make the capstan-pulleys draw the ready in the flier twice as fast as it can put the requisite number of turns in it, it is evident that the rope will be only half twisted when it leaves the flier E; but if the wheel M is made double the size of the wheel N the flier F will make twice as many revolutions as the flier E, so that if the flier E puts half the necessary number of turns in the rope the flier F, revolving at double the velocity, will put in the other half, which will complete the rope.

I claim as my invention—

1. The additional laying-flier F, when combined with the before-described machine, substantially as set forth, for the purpose specified.

2. The automatic stopping apparatus, when combined substantially as described.

3. The curvilinear dies, as shown at Fig. 5, for the purpose specified.

EZEKIEL GUILE.

Witnesses:

AMOS BROADNAX,

P. W. JOHNSTONE.