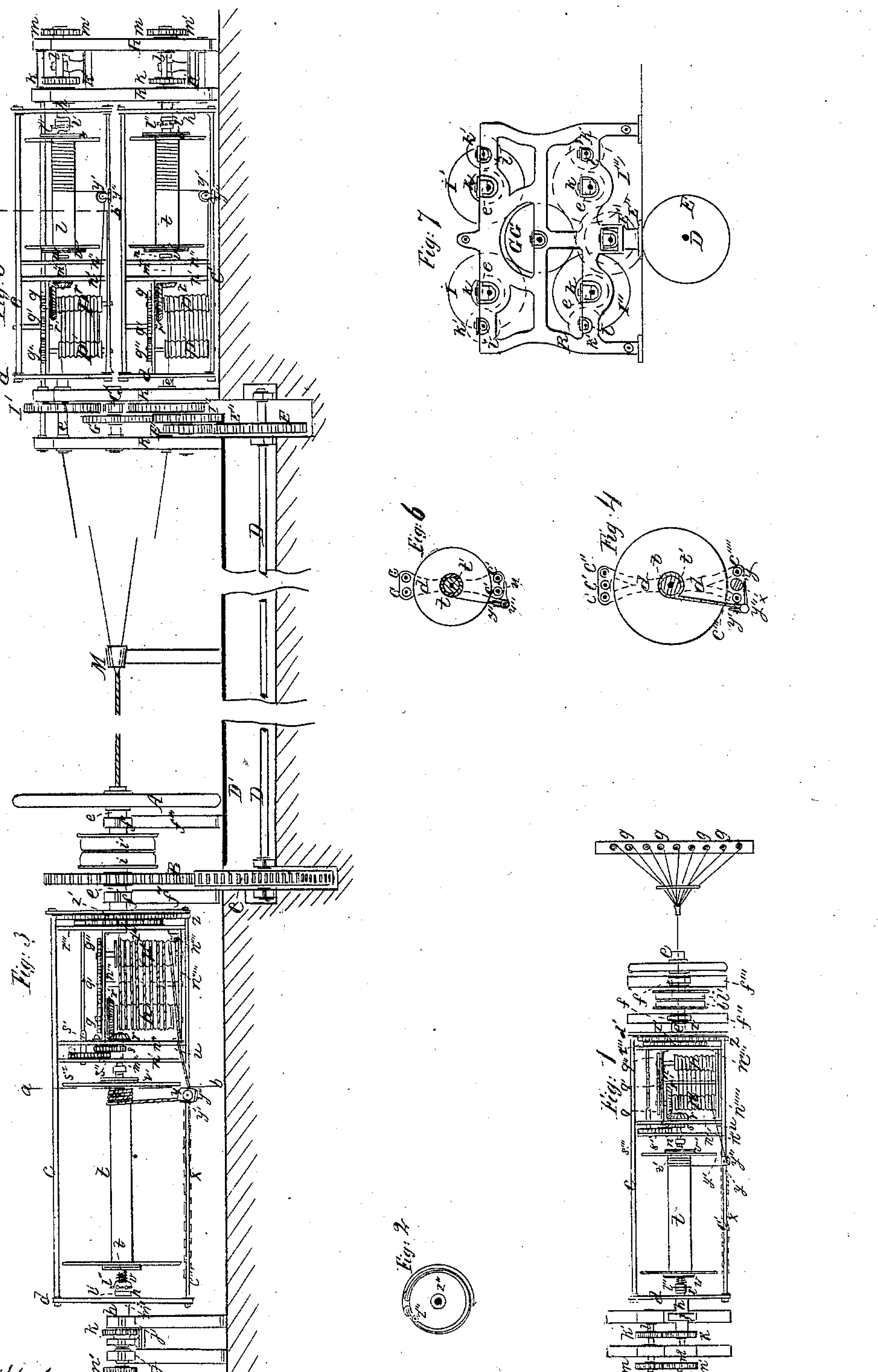
J. O. Mathieu,

Rope Machine

No. 46,057. Patented Jan. 24, 1865



Witnesses

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UNITED STATES PATENT OFFICE.

JULES OUARNIER MATHIEU, OF PARIS, FRANCE.

IMPROVEMENT IN MACHINES FOR MAKING CORDS, ROPE, &c.

Specification forming part of Letters Patent No. **46,057**, dated January 24, 1865.

To all whom it may concern:

Be it known that I, JULES OUARNIER MATHIEU, of Paris, France, have invented certain Improvements in Machinery for the Manufacture of Yarn, Strands, Ropes, Cords, Cables, or other Cordage; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object of these machines is the spinning of any description of filaments, the winding or warping of the same into strands of any required size, and the laying of cable with any required strain and torsion. The machines are intended to work automatically, and the work of the attendant consists merely in replacing, when required, for empty ones, the bobbins carrying the yarn or the large bobbins carrying the strands.

In the annexed drawings, Figure 1 represents a horizontal plan view of the machine for forming the strands.

The same consists of a flier, formed by two parallel rods, *c c'*, connected together by two cross-bars, *d d'*. The one, *d'*, is provided at its center with an arbor, *e*, round which the rotation takes place in the bearings *f f'*, fixed to the frame *f'' f'''*. The axis of this arbor *e* is hollow throughout its entire length, and somewhat bell-shaped toward the ends, for the passage of the strand formed by the yarn coming from the bobbins *g* and advancing toward the flier. The cross-bar *d* forms at its center one body with the axis *h*. This latter is hollow throughout its entire length, and revolves in a bearing, *j*. This axis *h* carries a tooth-wheel, *k*, in gear with another similar one, *k'*, fitted on the axis *l*. The latter also carries the wheel *m*, of a larger diameter, for driving the wheel *m'*, fitted in a fixed manner on the axis *m'*, coupled to the one, *m'''*, through the spool-shaft *l*. This latter, by means of the wheel *r*, drives the wheel *r'*, fitted on the axis of the grooved reel *p*, which reel drives another similar one, *p'*, by means of the wheels *q q' q''*.

i i' are fast-and-loose pulleys, fitted on the arbor *e*, for transmitting motion from any suitable prime mover to the flier, the axis *m''*, the the bobbin *t*, the axis *m'''*, and consequently to the reels *p p'*, the latter serving for dragging forward and properly stretching the strand while maintaining its torsion. The axis *m'''* revolves with greater speed than the flier by the effect of the difference in diameter of the wheels *m m'*, which difference may be varied according to the torsion to be imparted to the strands and according to their thickness. The bobbin *t*, on which the strand is to be wound, fits by the effect of mere friction on its axis, situated on the continuation of the axis *m''*. The axis of the bobbin is movable, and is fitted by means of a square head in the socket *n* of the arbor *m'''*. The axis *t'* of the bobbin is connected to the axis *m''* by means of a coupling-box, made of two pieces, *l'*, the cap of which is kept in position by a key, *l''*. By lifting this cap the bobbin may be removed and replaced by another one.

n' n'' n''' n'''' n''''' are cross bars, serving as props or rests for the working parts inside of the flier.

When the machine is working, the bobbin is driven by the friction of the disks *v v'*, which allow of adaptation to the varying diameter of the bobbin during the winding of the strand on this latter—viz., according to the number of layers of the strand wound on the bobbin.

x is a large threaded screw, situated parallel to the rods *c c'* and revolving in the cross-bars *d d'*. By means of this screw the advancing and receding motion is obtained of a sliding nut, *y*, which nut is fitted on the screw *x* and is guided by the rods *c'*, passing through this nut, which latter carries with it a pulley, *y'*, for laying the strand on the bobbin. The said pulley *y'* is fitted in a hinged cap, *y''*, in such manner as to adapt itself to the direction of he strand , according to its diameter of winding upon the bobbin. The screw *x* turns alternately to the right and to the left hand side, being driven by a pinion, *z*, in gear with a wheel, *z'*, fitting loosely on the arbor *e*. *z''* is a trundle or calender wheel revolving loosely with the wheel *z'*. This trundle is shown in front view in Fig. 2, and is driven by a wheel, *s*, which latter drives the pinion *z'''* by means of the connecting-wheels *s' s'' s'''*, situated between the cross-bars *n' n''*. The pinion *z'''*, Figs. 1 and 2, revolves in the inside of the trundle *z''*. After each revolution of this latter, the pinion *z'''*, continuing its revolution, the axis of the said pinion enters into a slot provided in the disk of the trundle, and, thus carrying forward the pinion, causes the trundle to revolve in a contrary direction to that of its

original motion, in the manner as indicated by the red line and arrow in Fig. 2.

From what has been explained it will be understood that, first, the torsion of the strand is obtained by the revolution of the flier; secondly, that the strand is laid in the circumferential grooves of the reels p p' immediately on entering the flier, the strand being laid several times on these reels by passing from one to the other, while these reels will drag the strand forward and at the same time maintain the required torsion thereof. The strand after leaving the reels passes through a ring, u, fixed to the cross-bar n'', from thence over the pulley y, and is by this latter guided on the bobbin by the action of the screw x; thirdly, that, the bobbin being dragged by friction, the velocity of its revolving motion will be dependent on the quantity of strand already wound on the bobbin; fourthly, that the bobbin being filled with strand may be easily removed from the machine and at once replaced by a fresh or empty bobbin.

The machine just described is intended to serve for warping and laying of strands, but the same may serve also for spinning and for twisting or twining by power any description of filamentous materials. It will be understood that in this latter case the various parts of the machine ought to be made of much smaller size than if intended to serve for laying strands.

Machine for laying cables.—For laying cables, I make use of a flier exactly similar to that just described, with the only difference that the size of the various parts forming the flier (shown in elevation view in Fig. 3) is to be considerably larger than that of those of the machine above described. Fig. 4 is a sectional view of this flier over the line a b, Fig. 3.

c c' c'' are parallel rods, represented in Figs. 3 and 4 as bolted to the cross-bars d d', connecting the rods c''' c''''. The screw x is situated at the place a third rod would occupy in a position similar to that of the rod c'. The rods c c' c'', the cross-bars d d', the rods c''' c'''', and the screw x form a flier of considerable strength.

e is the hollow arbor of the flier, revolving in the bearings f f' of the frame f'' f'''. The axis of this arbor is hollow, for allowing the cable to pass through it and enter the flier. This arbor is provided with fast and loose pulleys i i', and carries a fly-wheel, A, and the wheels B and C.

The mode of working of the bobbin, the reels, and slide-nut y, for laying the cable on the bobbin, is similar to what has been described above.

The cable may be made of any suitable number of strands, made by the machine described in reference to Fig. 1. For this purpose the bobbins, provided with strand, are placed in the fliers represented in Fig. 5, and situated opposite the machine, Fig. 3, for laying the cable.

Fig. 6 is a sectional view of one of the fliers, taken over the line a' b', Fig. 5. These fliers are similar to the one above described, with the exception of the difference in size of the various parts, and the absence of the screw x and of the parts for driving this latter. Each flier is driven separately by means of four wheels, I I′ I″ I‴, fitted on their respective axes e. These various connecting-wheels are shown in blue lines in the Fig. 7, which figure represents one of the frames, R, of the four fliers. The said wheels are driven by those G G′. The wheel G is in gear with the wheel E″, which latter is driven by the wheel E′, this wheel E′ by the wheel E, fitted on the arbor D, carrying the wheel C, above mentioned. The cogs of these wheels may be made either of wood or of cast-iron. The wheels E E′ may be replaced by wheels of different diameters for imparting a different degree of torsion to the strand. Each flier may be provided with a cylindrical jacket or drum, to be opened when required.

It is to be observed that on forming the strands, only about one-half of the full torsion ought to be given to them, the torsion being completed afterward in laying the cable by the said strand, the increase in torsion taking place in this latter operation in the same ratio as the strands being wound off from the fliers, Fig. 5, are wound on those, Fig. 3.

What I claim as new and original is—

The arrangement of the flier and bobbins or spools with their described intermediary connecting and operating parts, when constructed, arranged, and operating as and for the purpose herein described and represented.

Witnesses: OUARNIER MATHIEU.

DREYFOUS,

A. G. BRADE.