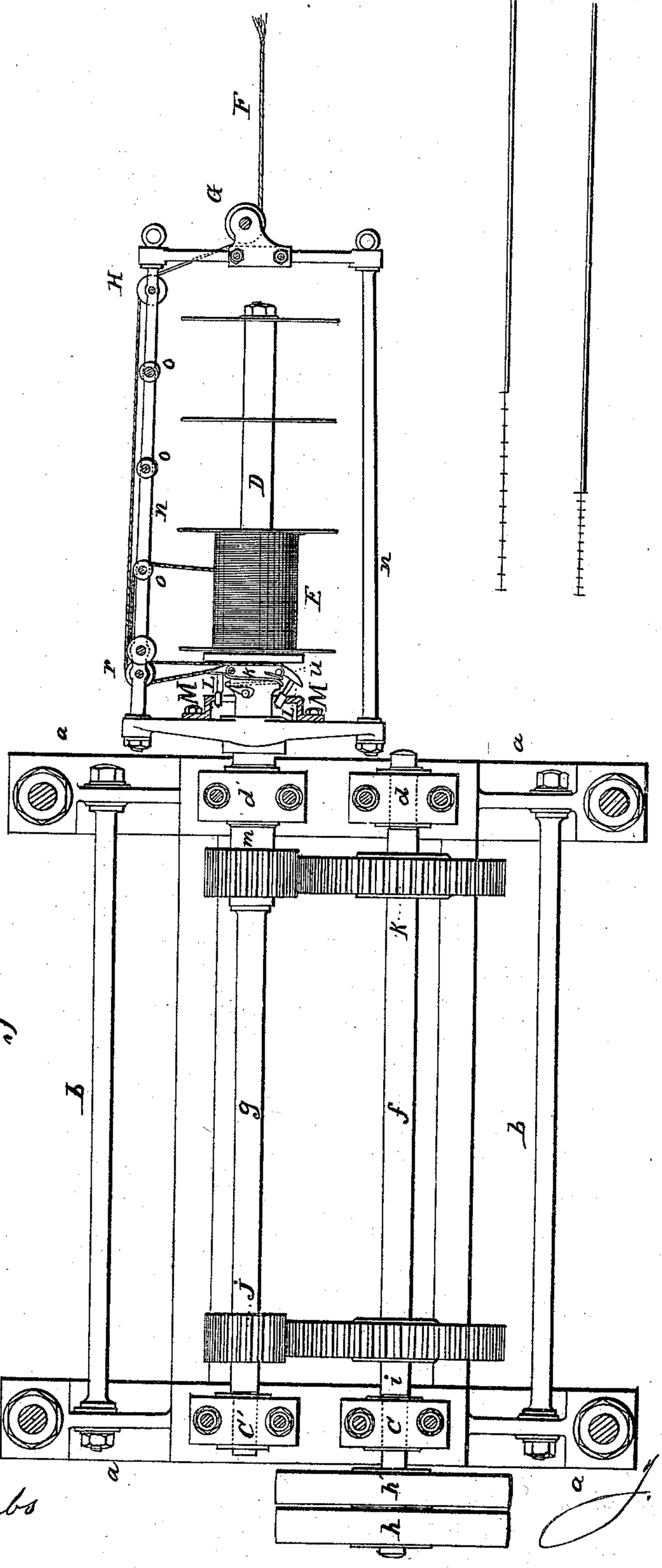
J. A. De Maniquet.

Sheet 1. 3 Sheets.

Cord and Rope Mach.

No. 43,461. Patented Jul. 5, 1864.



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Sheet 2 - 3 Sheets.

J. A. De Maniquet.

Cord and Rope Mach.

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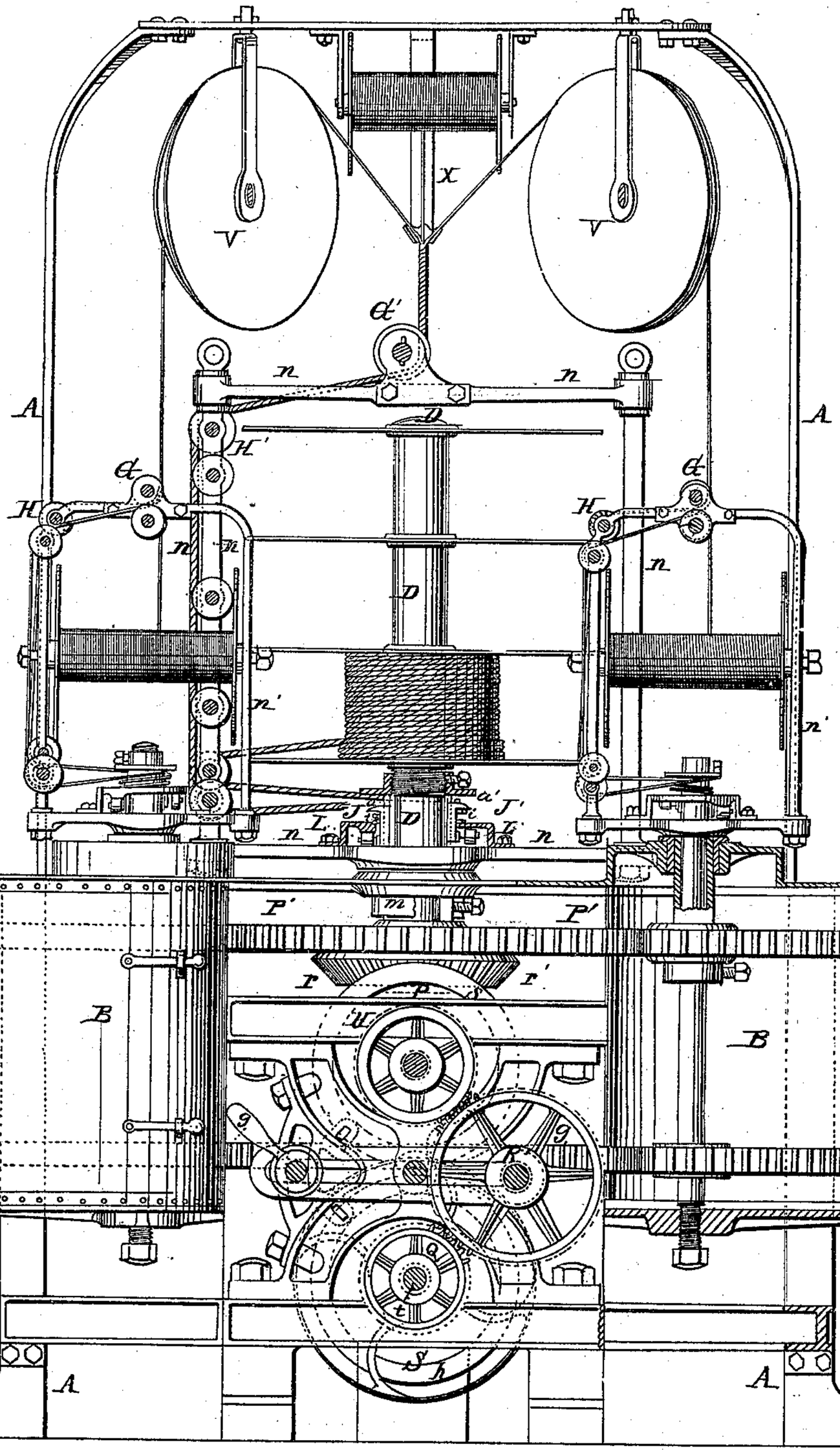
Fig. 2.



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Sheet 3 - 3 Sheets.

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Cord and Rope Mach.

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Fig. 3.

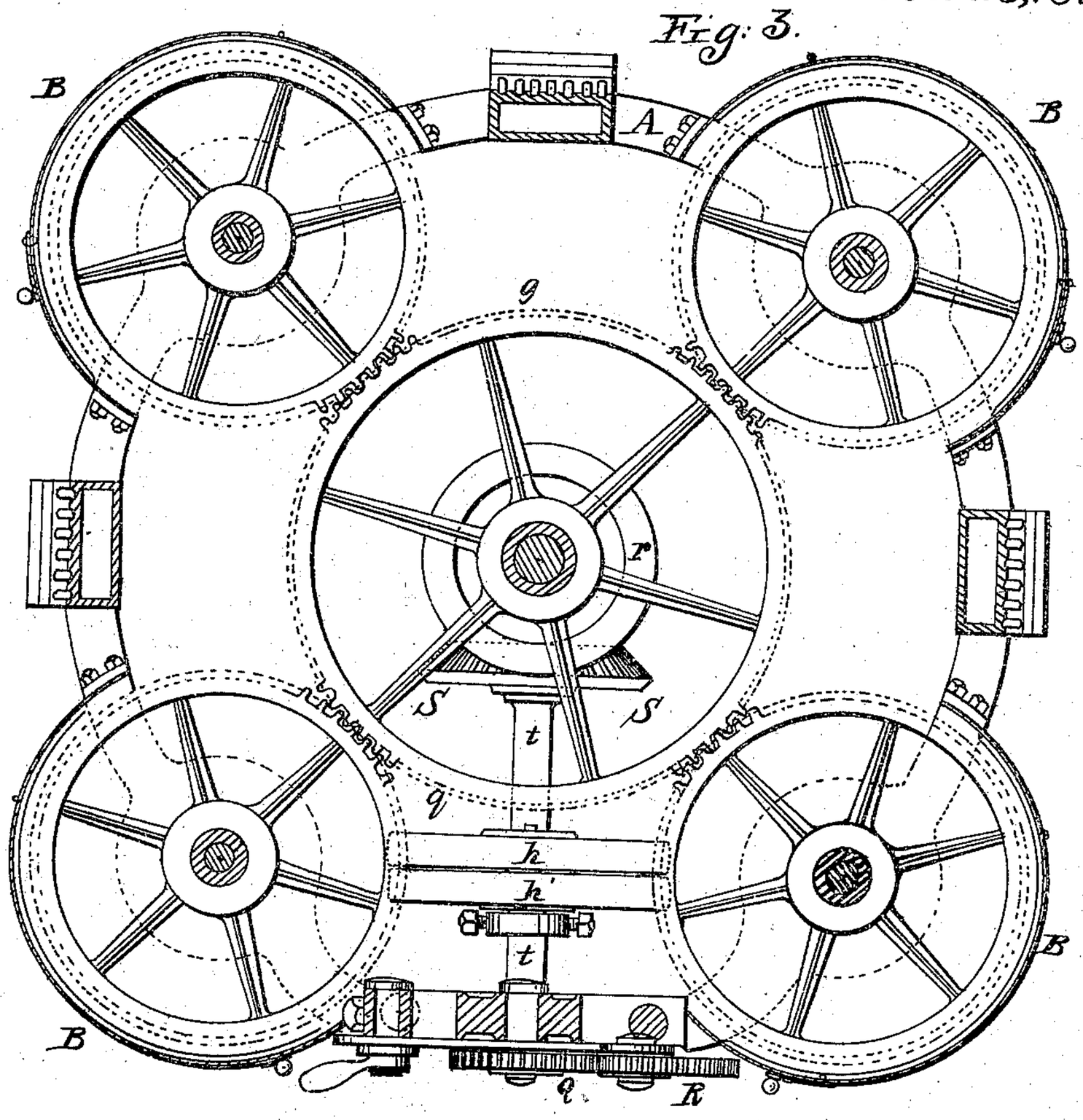


Fig. 4.

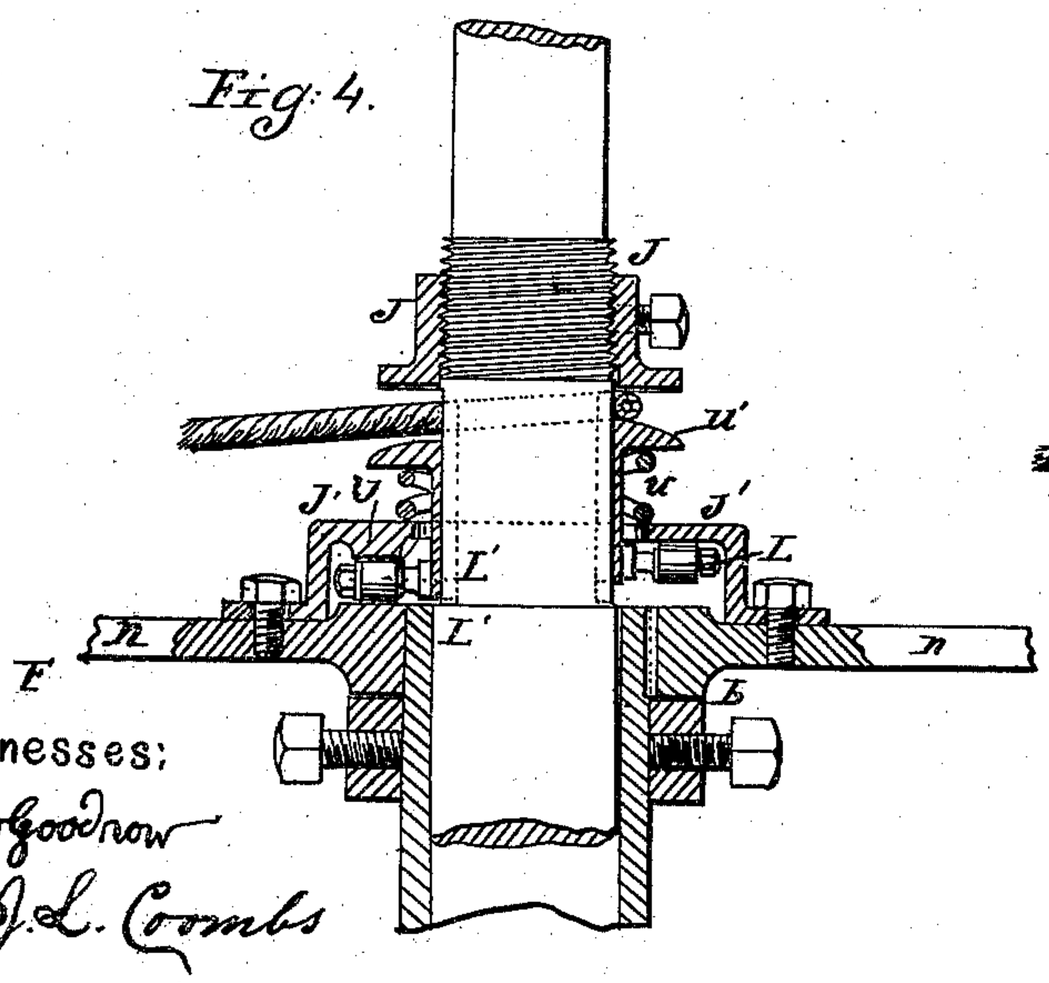
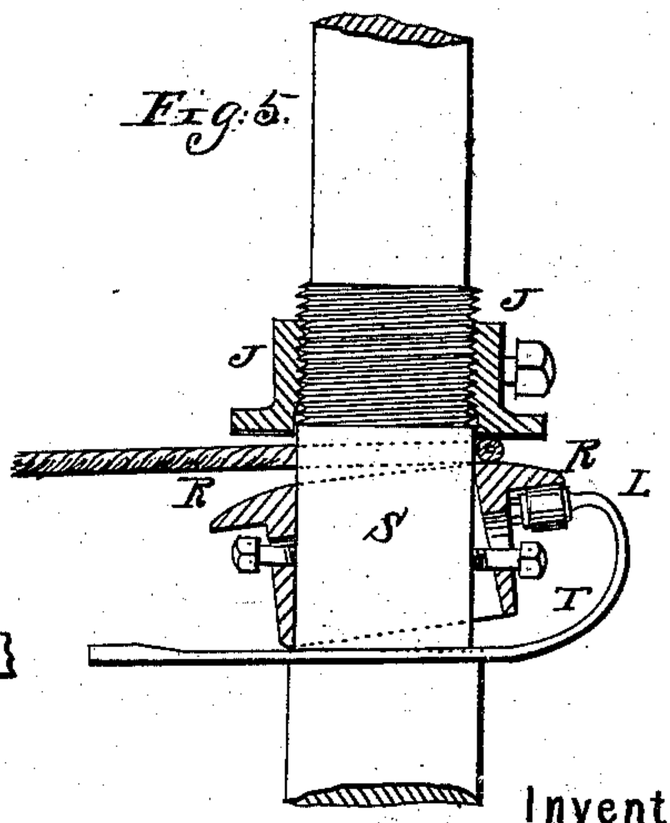


Fig. 5.



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UNITED STATES PATENT OFFICE.

JEAN ANTOINE DE MANIQUET, OF PARIS, FRANCE.

IMPROVEMENT IN MACHINES FOR MANUFACTURING CORDS, ROPES, &c.

Specification forming part of Letters Patent No. **43,461**, dated July 5, 1864.

To all whom it may concern:

Be it known that I, JEAN ANTOINE DE MANIQUET, of Paris, in the Empire of France, have invented certain new and useful improvements in the manufacture of cords, ropes, and cables, and in machinery employed therein, applicable also to spinning, winding, and twisting fibrous and filamentous substances; and I hereby declare that the following is a full, clear and exact description of the same, reference being had to the drawings hereunto annexed.

This invention is based upon the proportional resistance of the strands composing the cord, rope, or cable, according to their thickness or torsion—that is to say, that if in a rope composed of four or five strands, and manufactured according to the ordinary method, there be one or several of different thickness and of unequal torsion, the strain borne by the entire rope being equally spread over each strand, the weakest will break first, consequent upon its want of resistance comparatively with the others. Each strand will thus break successively, as the resistance offered by the entire rope is no longer sufficient to resist the strain exerted upon it. By the method of manufacture which forms the subject of this invention the whole strain is, on the contrary, spread proportionally over each strand notwithstanding its varying thickness and torsion. The result is that the rope is capable of exerting its maximum tension without breaking.

The manufacture, according to the present invention, is divided into three distinct operations—videlicet, spinning, winding or warping, and twisting. These three operation are performed in two machines, hereinafter described—videlicet, a spinning-machine which performs also the winding and warping, and a twisting-machine. These two machines will be well understood on reference to the accompanying drawings.

Figure 1 is a plan of the spinning-machine. Fig. 2 is a sectional elevation of the twisting-machine. Fig. 3 is a horizontal section of the twisting-machine, taken at the top of the mechanism for driving the fliers. Figs. 4 and 5 are details on a larger scale of the different arrangements I apply to the fliers for nipping.

First operation, spinning.—The machine used for this purpose is mounted on frames *a a*, of cast-iron, wood, or other material, united by cross bars *b*. On the frames *a* bearings *c c' d d'* are fixed, in which shafts *f g* are free to revolve. The main shaft *f* carries two pulleys, *h h'*, one of which is loose. Inside the frame is a toothed wheel, *i*, which gears into a pinion, *j*, fixed on the shaft *g* of the spindle D. A second toothed wheel, *k*, fixed on the shaft *f*, gears into a pinion, *l*, on the socket *m* of the flier *n*. The flier, being one of the chief features of this invention, will be described hereinafter in all its details, and according to the different methods of mounting it. The pinion *j*, which drives the spindle D, and the pinion *l*, which drives the flier, being of different diameters proportional to the wheels *i* and *k*, the wheels turn in the same direction but at different speeds. The object of this arrangement is to impart at the same time a twist to the strand and to wind it upon the bobbin E, as will be explained in the description of the flier and its operation. The hemp for forming the strand is kept stretched at F, and becomes twisted by the flier *n*, which makes five hundred revolutions a minute. The strand then passes under a grooved roller, G, then over another grooved roller, H, and a third grooved roller, *r*. On leaving the roller *r* the strand is nipped between a grooved cap, J, and a hinged nipper, *u*, on the socket K. The nipper *u* carries two rods, L, to which rollers are attached, abutting interiorly against an eccentric ring, M, fixed on the rail of the flier *n*. Springs *r*, pressing upon the nippers *u u'*, cause them to press against the cap J. The cap J is threaded, as represented in Figs. 2, 4, and 5, in order that its position may be regulated according to the thickness of the strand. The flier in revolving carries with it the eccentric ring M, which, by pressing upon one or other of the rollers L, opens first, the nipper *u*, then the nipper *u'*. The strand is in turn seized by one of these nippers, and released by the other as the flier and spindle revolve. It thus receives sufficient tension to be wound up, for which purpose it is passed over a pulley, N, and over one of the rollers *o o o*, which facilitates its winding on one of the compartments of the bobbin or drum E. When the bobbin E is full, it is removed by unscrewing the bolt P, and an empty one is substituted for it. The nipping apparatus may be varied, as shown, for instance, in Figs. 1, 2, 4, and 5. In the apparatus shown at Figs. 2 and 4 the nip-

pers *u u'* have substituted for them slides carrying rollers L' L', which pass under the cam J', and the nippers of each slide are pressed upon by springs, as already explained; or a socket, R, (see Fig. 5,) widened at bottom, may be made to oscillate round the spindle S. This socket is kept pressed against the grooved cap J by the roller L, fixed on the end of a strong spring, T; or the spring may be placed under the cam or eccentric ring, but in that case the eccentric would push the lever or nipper from above instead of acting from below, as before. The object of these different arrangements is to retain the cord at a given moment nipped between the cap J and the appliance for pressing, in order to obtain the necessary tension.

Second operation, warping.—The warping of the spun strand is effected in a machine precisely similar to that above described, but of larger proportions. The bobbin carrying the spun strand is placed on the spindle of the machine, which imparts to it a regular torsion before being submitted to the twisting-machine.

Third operation, twisting.—This machine consists of a circular or polygonal frame, A, supported on four or six cast-iron feet. The circumference is divided into four parts, on each of which is a drum, B, of sheet-iron, fixed to the frame A by rivets or by any other mode of attachment. The two bottoms of the drums are formed by plates *o*, cast with the frame and strengthened by ribs. In the center of the frame is a vertical shaft, *p*, supported by bearings and collars. It is prolonged above the frame and forms the spindle D, or rather the axis of the drum E. On the shaft *p* a large toothed wheel, *q*, is fixed concentric with a bevel-wheel, *r*, which receives motion from another bevel-wheel, *s*, on a horizontal shaft, *t*, on which the driving-pulleys *h h'* are fixed. Outside the frame, and on the same shaft, *t*, there is a toothed wheel, Q, which, through the wheel R', actuates the wheel U on a horizontal shaft, *t'*. This shaft is similar to the shaft *t*, with the exception of the driving-pulleys. It carries a bevel-wheel, *s'*, in gear with the bevel-wheel *r'*, in a piece with a large toothed wheel, *p'*, on the socket *m* of the flier *n*. Four small fliers are arranged round the central spindle to receive the spun and warped strands. The fliers and spindles are arranged, as has been already mentioned for the spinning and warping machine, and carry drums or bobbins E', placed horizontally, from which all the strands for forming the rope or cable proceed. Each strand on leaving the flier *n'* is subjected to torsion, and passes over a large pulley, V, and then through a guide or "twizzle." On leaving the twizzle the strands become united in one, either by themselves alone or around a central core, X, as seen in Fig. 2. When the rope or cable is being formed—that is to say, when the large central flier, *n*, and the drum E work—each of the strands, according to its torsion or size, becomes more or less elongated. The thickest becomes first placed on the core, if there is one, then the strand next larger, and so on for all the strands. This is supposing there be inequality in the strands. Thus a rope or cable is formed, all the parts of which are equally distributed in proportion to the resistance they are capable of presenting. When all the strands are equal in diameter and torsion, they become twisted together and form a strong and even cable. The rope becomes twisted and wound upon the drum on the main spindle in a similar manner to the winding of the strands upon the bobbins, as before explained. The twisting-machine may be arranged horizontally—that is to say, the three or four spindles which carry the strands may be placed at a distance of, say, six or seven feet from the twisting-spindle, which is in front, and may be worked by a driving-shaft or by pulleys. The chief object of the large pulleys is to facilitate the passage of the twist of the strand, which, when it has once entered the groove of the pulley, cannot be again diverted until it arrives at the twisting-spindle. This is an essential feature in this invention.

This invention is not limited exclusively to the manufacture of ropes and cables; it may also be applied to the spinning, winding, and twisting of hemp, flax, jute, cotton, wool, silk, and all other fibrous and filamentous substances.

Having now described the nature of the said invention and in what manner the same is to be performed, I declare that I claim—

The making of cords, ropes, and cables in the manner and by machinery constructed and operating substantially as herein described, whereby the whole strain upon the said cords, ropes, or cables is proportionally spread over each strand composing them notwithstanding its varying thickness and torsion.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

J. A. DE MANIQUET.

Witnesses:

E. SHERMAN GOULD,

J. JAMUS.