Sheet 1 - 3 Sheets.

J. A. Bazin.
Cordage Mach.

No. 56,485. Patented Jul. 17, 1866.

Fig: 2.

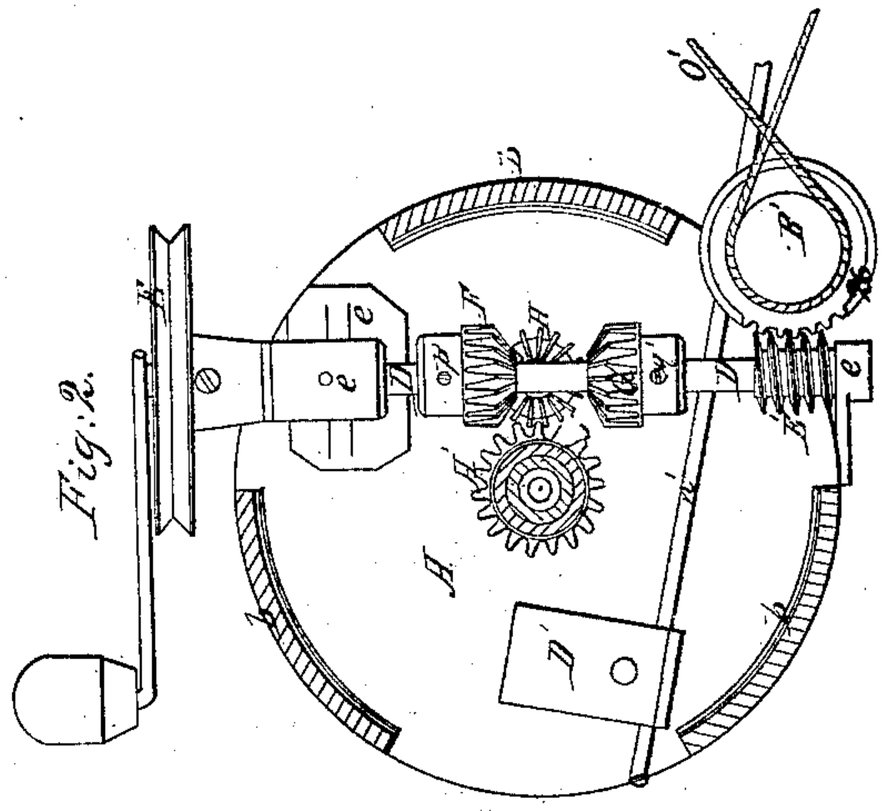

Fig: 12.

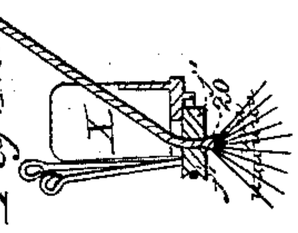

Fig: 10.

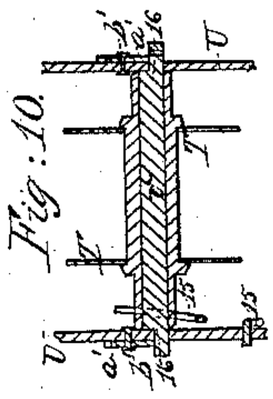

Fig: 11.

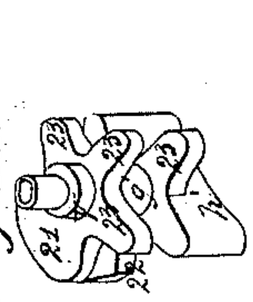

Fig: 1.

Fig: 9.

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Sheet 2 - 3 Sheets.

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Cordage Mach.

No. 56,485. Patented Jul. 17, 1866.

Fig. 4.

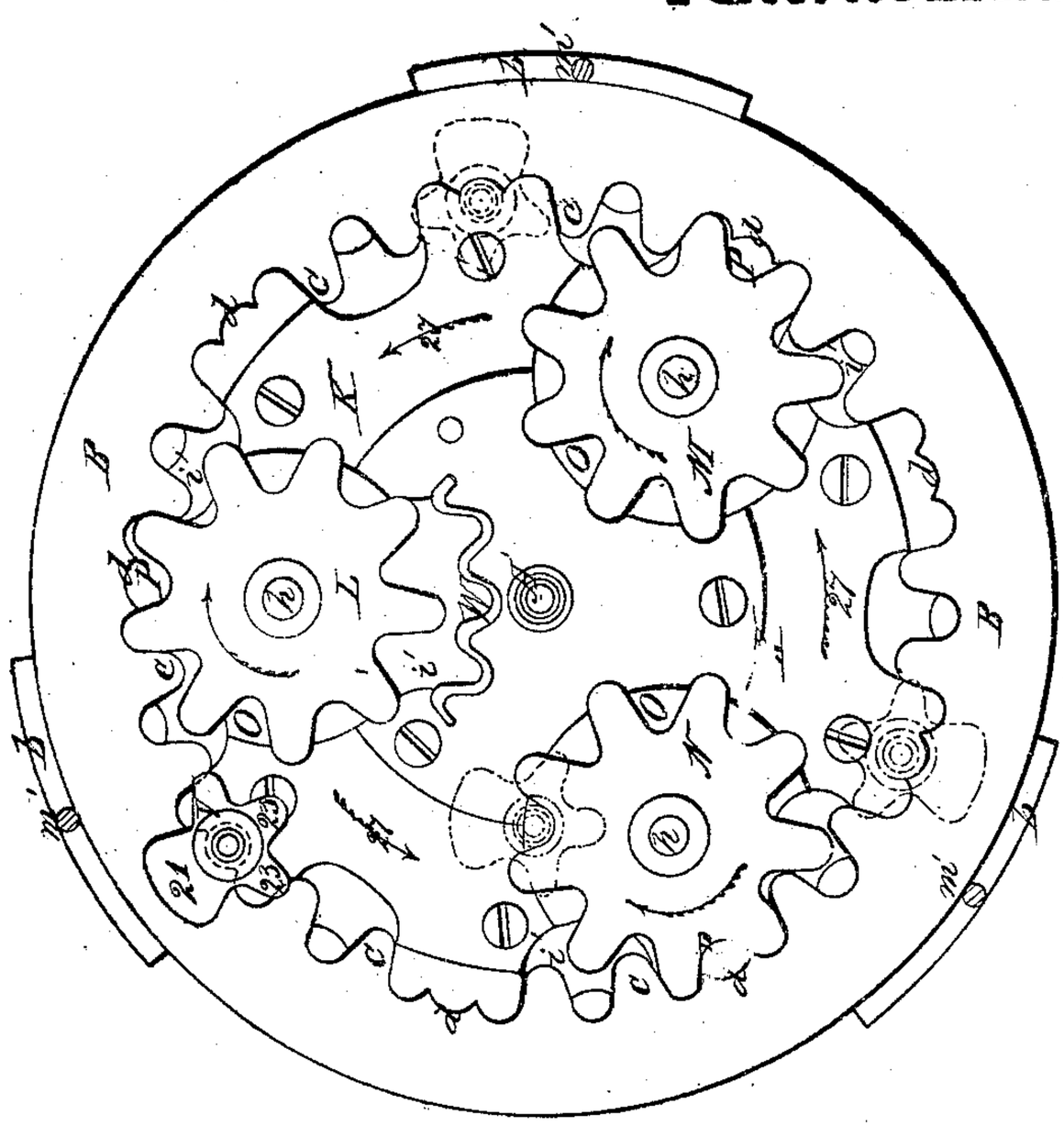
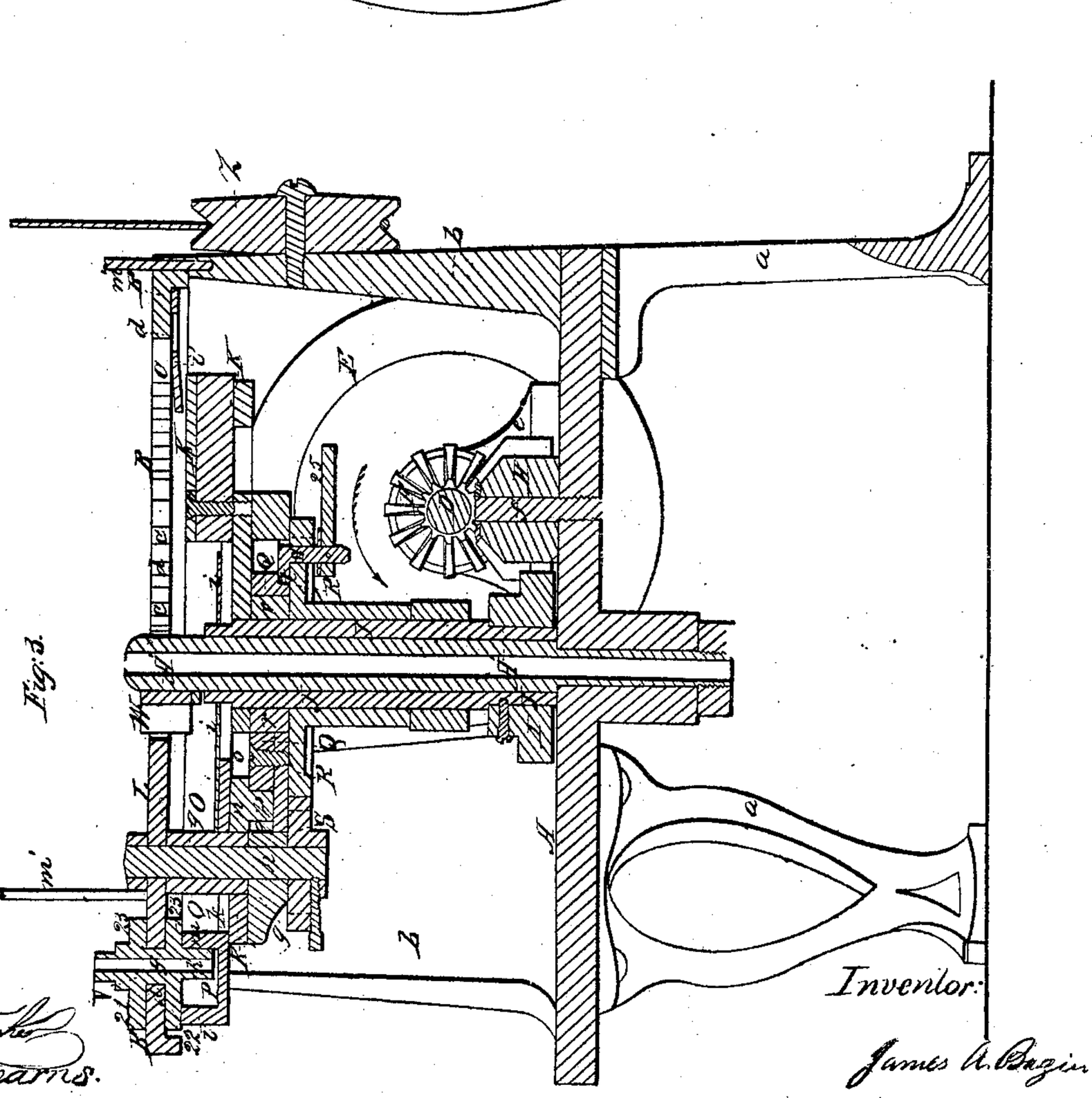


Fig. 5.



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Sheet 3- 3 Sheets.

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No. 56,485. Patented Jul. 17, 1866.

Fig: 6

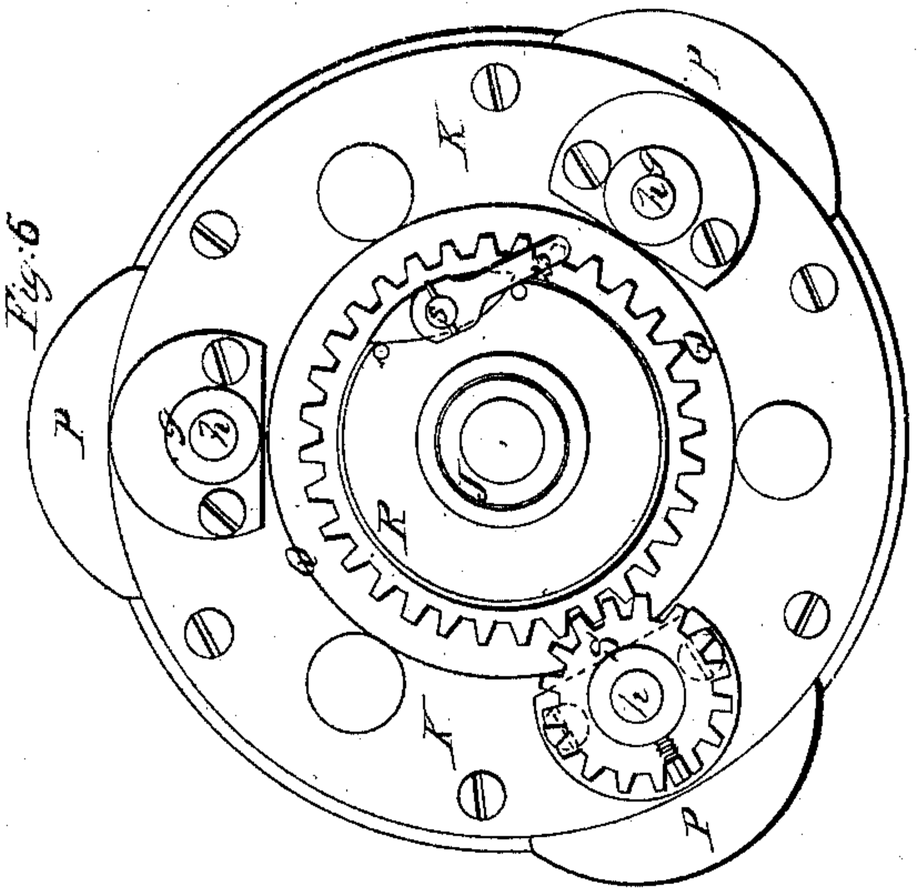


Fig: 8.

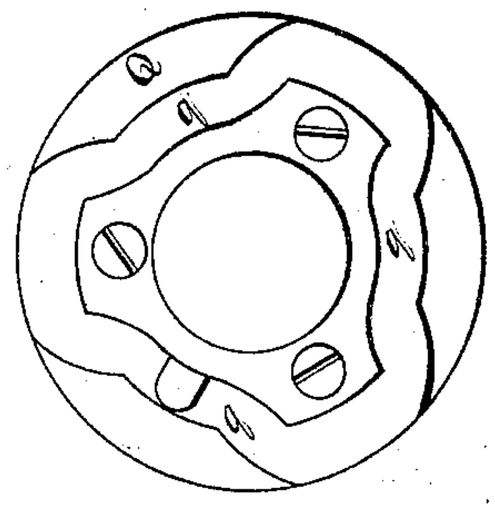


Fig: 5.

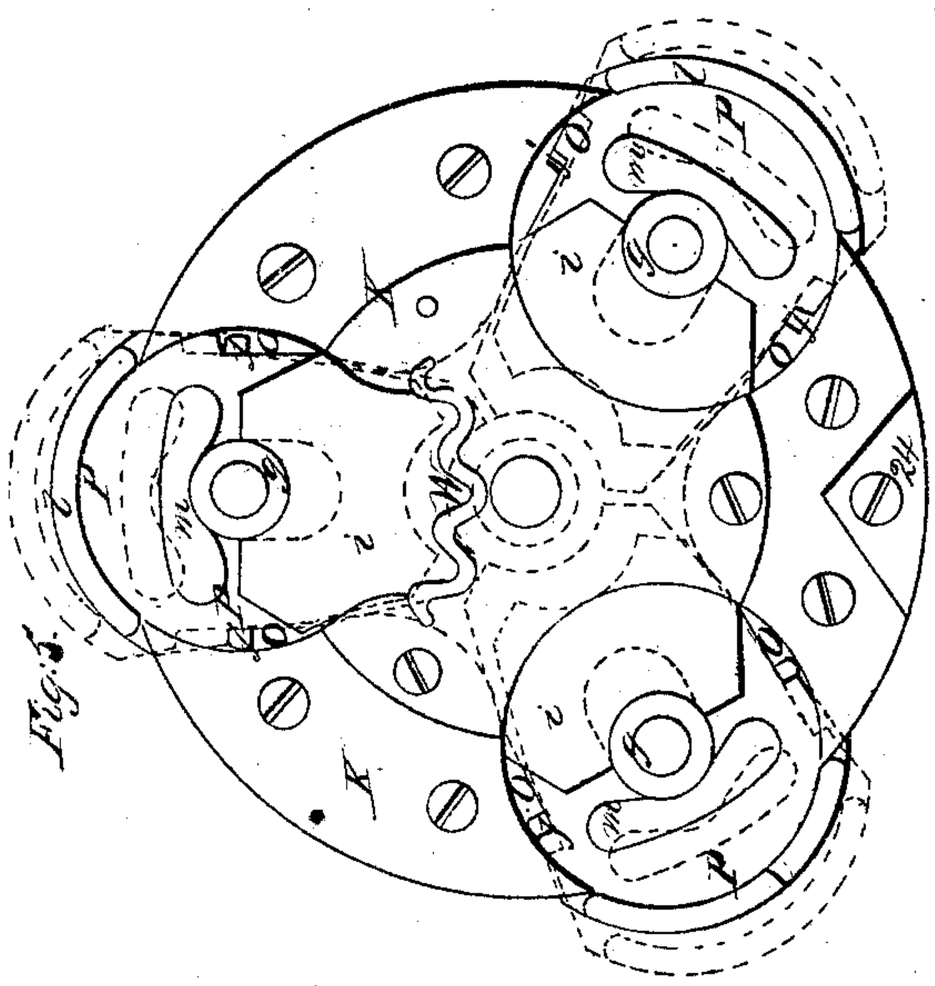
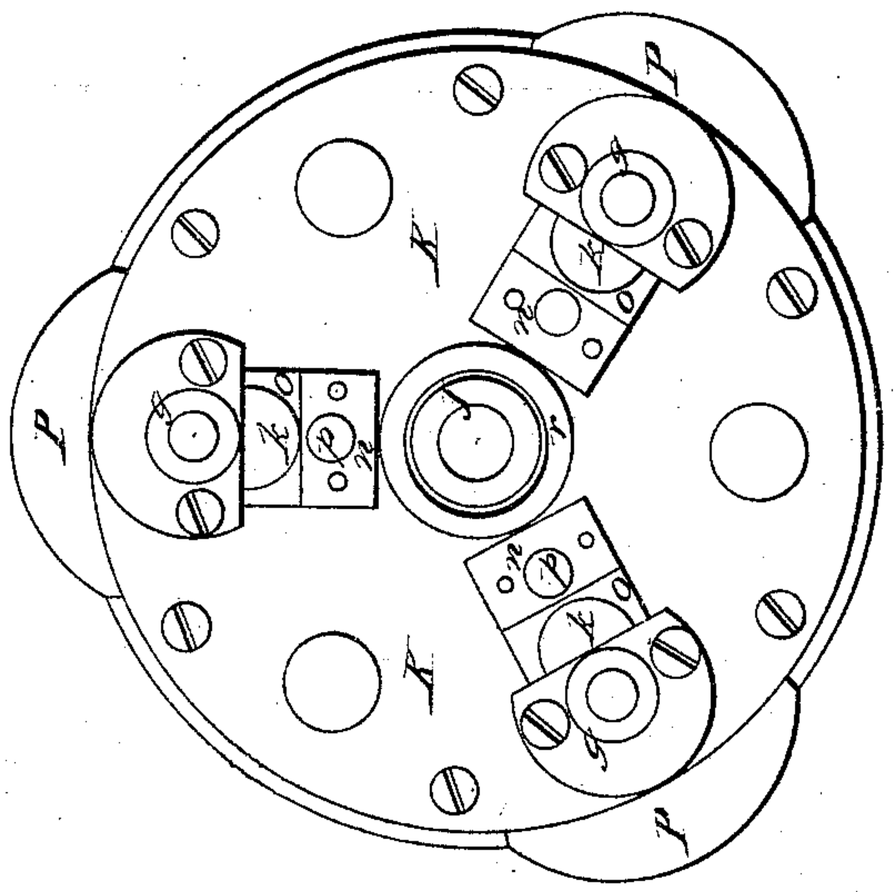


Fig: 7.



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Inventor:
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UNITED STATES PATENT OFFICE.

JAMES A. BAZIN, OF CANTON, ASSIGNOR TO HIMSELF, A. B. HALL, OF WEST ROXBURY, AND C. SCOTT AND W. J. TOWNE, OF NEWTON, MASS.

IMPROVEMENT IN MACHINES FOR MAKING CORDAGE, WEBBING, &c.

Specification forming part of Letters Patent No. **56,485**, dated July 17, 1866.

To all whom it may concern:

Be it known that I, JAMES AMIRAUX BAZIN, of Canton, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Machinery for Making Cordage, Webbing, &c., in which the strands are combined by an interlocking twist, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of my improved machine for making cordage, &c. Fig. 2 is a horizontal section through the same below the revolving platform. Fig. 3 is a central vertical section through the same, all the parts above the toothed ring with the exception of one spool-frame carrier being removed. Fig. 4 is a plan of the machine, the same parts being removed as in Fig. 3. Fig. 5 is a plan of the revolving platform and sliding plates detached. Fig. 6 is a plan of the under side of the same. Fig. 7 is a plan of the under side of the same, the cam-wheel and gears connected therewith being removed. Fig. 8 is a plan of the cam-wheel detached. Fig. 9 is an elevation of one of the spool-frames with its carrier detached. Fig. 10 is a section through one of the spools and a portion of its frame. Fig. 11 is a perspective view of one of the spool-frame carriers. Fig. 12 is a section through the tube or conductor through which the finished rope passes.

My present invention relates to certain improvements in machinery for making cordage, &c., for which Letters Patent of the United States were granted to me on the 29th day of June, A. D. 1858, in which a series of irregular-shaped gears furnished with curved arms were employed to throw the shafts of the spool-frames into a position to be taken and carried round by another series of gears, for the purpose of giving to the spools the required motions to produce an interlocking twist. The continual striking, however, of the ends of these arms against the shafts of the spool-frames not only wore away the parts at the points of contact, but also battered and bent the shafts and otherwise injured the machine, so that it soon became disarranged and out of order.

To overcome these difficulties and reduce the friction and wear of the machine are the object of my invention, which consists in a new combination and arrangement of mechanism whereby the desired end is effected in a simple and effectual manner.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A is the bed-plate, which is supported on legs *a*. From this bed-plate rise the standards *b*, which support a circular plate or ring, B, the inside of which is provided with teeth *c*, every third tooth being cut away at *d*, for a purpose that will be explained hereinafter.

D is the driving-shaft, which runs in bearings *e* rising from the bed A, and carries at one end the driving-pulley E, and between the bearings *e* the bevel-gears F G, one of which engages with the intermediate gear, H, which revolves on a pin, *f*, projecting up from the bed-plate A, and engages with a gear, I, secured to the lower end of a hollow shaft, J, which revolves on a hollow vertical shaft or spindle, A′, projecting up from the center of the bed A, and carries at its upper end a circular platform, K, (seen detached in Figs. 5, 6, and 7,) and this platform is provided with bearings *g*, in which revolve the shafts *h* of three gears, L M N, which engage with the teeth *c* of the ring B as the platform K is revolved. In this platform are formed three recesses, O, of the form shown in Figs. 4 and 5, at the bottom of each of which is fitted a plate, P, which slides in suitable grooves, and is steadied and held in place by means of a plate, *i*, and pins *j*, a slot, *k*, Fig. 7, being formed in the plate P, so that it will play on the fixed bearing *g*. The outer end of this sliding plate P is furnished with a curved ledge or projection, *l*, Figs. 3 and 5, so that when it is in the position seen in black in Fig. 5 it will close the outer end of the recess O and form a circle. The plate P is also provided with another projection, *m*, the outer edge of which forms a continuation of the periphery of the platform K when the sliding plate is in the position shown in red, Fig. 5.

To the under side of each plate P is secured a block, *n*, which slides in a slot, *o*, cut through the platform K, and from this block projects

a pin, *p*, which fits into the cam-groove *q* of the wheel Q, Fig. 8. This cam-wheel Q fits loosely over a collar, *r*, on the shaft J, Fig. 3, and is driven by a cog-wheel, R, which fits over and revolves loosely on the shaft J, and is provided with a pin, *s*, which fits into a slot, *t*, on the cam-wheel Q, and the two are thus caused to revolve together.

The wheel R is driven by a smaller gear, S, secured to the end of the shaft *h* of the wheel L, and thus, through the connections explained, the motion of the wheel L is communicated to the cam-wheel Q, each revolution of which causes the plates P to be moved toward and from the center of the platform three times, for a purpose that will be explained hereinafter.

The number of teeth on the wheel L is such that it will be revolved three times by each revolution of the platform K, while two revolutions of the gear S attached to its shaft are required for one revolution of the cog-wheel R and cam-wheel Q attached to it. Consequently two complete revolutions of the platform K cause the sliding plates P to be moved back and forth nine times.

T are the spools upon which the strands *u* are wound. These spools revolve on shaft *v*, Fig. 10, which are supported in the spool-frames U, (of the form seen in Figs. 1 and 9,) the spools being prevented from revolving loosely by springs 15 bearing against them, as seen in Figs. 1 and 10.

The shafts *v* are cut away at each end, so as to leave a shoulder, 16, Fig. 10, over which fits a notched disk, *a'*, which turns on a pivot, *b'*, and serves to lock the shaft in place in the frame U.

When it is desired to remove the spool from its frame U one of the disks *a'* is turned so as to bring its notch into the position seen in red in Fig. 9, when the shaft *v* can be drawn out, as required.

To the under side of the circular top plate of the frame U is secured an inclined strip, *c'*, to which is fastened, by means of a screw, 17, the flat spring *d'*, between the upper end of which and the strip *c'* passes the strand *u*, which is first led from the spool T over the bar *e'* and through the staple 18 and hole 19 in the strip *c'*, the bar *e'* serving to prevent the strand from running off the edge of the spool when full.

The pressure of the upper end of the spring *d'* on the strand and the consequent degree of tension produced are regulated by means of the screw 17, which is prevented from becoming loose and falling out when the machine is in operation by means of a wire spring, *f'*, which embraces the screw just under its head and holds it tightly in place. Each strand *u* passes through the opening in the top plate of the frame U, whence it is led to the point 20, where the rope is formed.

The manner in which the spool-frames U, with their spools, are actuated so that two of the strands *u* will be held stationary while another is passing around them to form the interlocking twist will now be described.

To the bottom of each of the frames U is secured a toothed carrier, V, (seen detached in Fig. 11,) the portions 21 22 of which fit one above and the other below the toothed ring B, while the central portion, *g'*, fits into one of the cut-off teeth *d*, as seen in Figs. 3 and 4, and the lower curved portion, *h'*, fits against the periphery of the platform K.

As the motions of each of the spool-frames U while being carried around the toothed ring B are exactly alike, I will describe that of one only, referring particularly to Fig. 4, in which one spool-frame carrier only is shown in place without the spool-frame, the remaining eight being removed from the machine.

The carrier V being in the position shown in black, with its central portion, *g'*, in one of the cut-off teeth *d*, and the platform K being revolved, the plate P is moved out into the position seen in red in Fig. 5, causing the ledge *l* to pass outside the portion *h'* of the carrier V. The plate P is now drawn in so as to inclose the lower portion of the carrier in the circular recess O, around which it is carried, as seen in green, by the revolution of one of the gears L, M, or N, which engages with the central portion, *g'*. As soon as the carrier is left by this gear in the cut-off tooth *d*, as seen in red, the plate P is moved out and retained in that position until it passes out from under the carrier, which then remains in the position seen in red until the next plate P arrives opposite to it, when it is carried around the next recess O by the revolution of the next gear into the position seen in blue, and again in a similar manner, by the revolution of the third gear around the third recess O, into the position from which it started.

W is a curved rack, with which the toothed portion 23 of the carrier engages as it is carried around by the wheel L, so as to turn the carrier V in a direction to put the twist into the strand, which is taken out by its being carried around in the recesses O by the wheels L M N. Every third spool-frame is thus carried around one of the recesses O, while the other two remain in the toothed ring B, as seen in Fig. 1, and each spool-frame, in its turn, is carried around each of the recesses O and entirely around the machine, which causes the strands to be interlocked, as required.

When the carriers V are in the recesses O the wheels M N may be raised up vertically to allow of their insertion or removal, and a portion, 24, of the edge of the platform K is made removable for a similar purpose.

I do not intend to limit myself to the particular number of spools and strands above mentioned, as it is obvious that by varying the size of the toothed ring B any number which is the multiple of 3 can be used, the number of gears L M N being also varied, one gear, with a sliding plate, P, and recess O in the platform K, being required for every three strands. If, however, the number of

strands be increased in the same ratio beyond twelve, a hollow cylinder will be formed, which will answer for engine-hose, stout belting, &c., while, if any one of the strands be left out, a flat band or webbing of a single thickness will be formed; and when the machine is to be used particularly for the manufacture of webbing the toothed ring B, instead of being stationary, as above described, may be made to revolve by suitable mechanism in a direction contrary to that in which the spools are traveling, in order to prevent the twisting of the finished fabric, which would take place if the toothed ring were stationary.

When it is desired to form a rope with a core or heart piece, the wire, rubber, cord, or other material to be employed for this purpose is passed up through the hollow central spindle, A′, to the point where the rope is being formed.

To the under side of the ring B are riveted a series of plates, *i′*, Figs. 3 and 4, which fit one on each side of the carriers V when they are in the cut-off teeth *d* of the ring B, and prevent them from being thrown out of place until they are taken by the gears L M N.

The upper portion of the pin *s*, which projects up from the gear R into the slot *t* of the cam-wheel Q, is made eccentric, and is provided with a handle, 25, by turning which the cam-wheel Q may be thrown a little ahead of the gear R in either direction, so as to insure the sliding plates P being thrown out in time to clear the edges of the carriers V as the platform K revolves.

The rope, as it is formed, passes through an opening in a plate, *j′*, Fig. 12, at the bottom of a tube or conductor, X, the opening corresponding exactly to the size of the finished rope, so that in passing through it all the inequalities are smoothed down and the rope prevented from cockling.

The plate *j′* is made in two pieces, half of the opening being made in each piece, and the two pieces being held together and in place by a suitable clamp.

When a different-sized rope is to be made it is merely necessary to remove the plate *j′* and substitute one having a hole of the size required.

After leaving the conductor the rope passes over the pulleys *k′ l′* on the bar *y*, which is supported on the bent rods *m′* rising from the standards *b*, and thence over a pulley, Z, which revolves on a pin projecting from one of the standards, *b*, to another pullley, B′, around which it is wound four or five times, whence it is led to the reel C′, by which it is taken up, as seen in Fig. 1. This reel C′ is supported at the end of a bar, *n′*, held in place by a clamp, D′, and is revolved by means of a belt, *o′*, passing around the lower portion of the pulley B′, which is attached to a horizontal gear, 26, revolving on a stud projecting up from the bed A and engaging with the worm E′ on the end of the driving-shaft D.

The platform K, with the spools, may be revolved in either direction in accordance with the direction of the twist of the strand, as it is necessary that the spools should always revolve in the same direction as the twist, in order that all the fibers shall lie lengthwise of the rope, as required, to insure the proper strength.

When it is desired to revolve the platform in a direction contrary to the arrows 27, Fig. 4, the set-screw *p′* in the bevel-wheel F is loosened, so that the wheel F can be moved back on the driving-shaft D out of gear with the intermediate wheel, H, and the bevel-gear G is moved up on the same shaft, so as to engage therewith, and is secured in place by a set-screw, *g′*. This device allows the driving-shaft to be always revolved in the same direction.

The following advantages are possessed by cordage, webbing, and other similar fabrics made by the above-described machine:

The strands are combined by an interlocking twist, in which they all take the same spiral form that they would have in a twisted rope of ordinary manufacture, and yet hold each other in place more effectually than can be done by braiding; this interlocking twist being formed by successively passing each strand around two others, so that each of the two so entwined shall, in its turn, entwine two others, and, as the strands all maintain this spiral form irrespective of the twist in each, there can be no unnecessary strain upon the fibers of which they are composed, while under all circumstances each strand will bear an equal amount of strain with all the others and cannot possibly kink or become misplaced.

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

1. In a machine for making cordage, webbing, and other similar fabrics, so actuating the spools by mechanism consisting, essentially, of the revolving platform K, furnished with a series of gears, L M N, sliding plates P, and recesses O, in combination with the toothed ring B and a series of carriers, V, with their spool-frames, that each strand will be carried around two stationary ones, and thereby form an interlocking twist, as set forth.

2. The above-described mechanism, in combination with the rack W, for the purpose described.

3. The sliding plates P, operated by a cam-wheel, Q, in combination with the platform K and a series of carriers, V, with their spool-frames and spools, operating substantially as set forth.

4. The combination of the gear L with its shaft *h*, gears S R, and cam-wheel Q, for operating the sliding plates P, as described.

5. Adjusting the cam-wheel Q by means of the eccentric-pin *s* on the gear R, as set forth.

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