3 Sheets—Sheet 1.

J. WINTER.

Punching, Knotting and Stringing Machine for Tags, Pamphlets, &c.

No. 206,758. Patented Aug. 6, 1878.

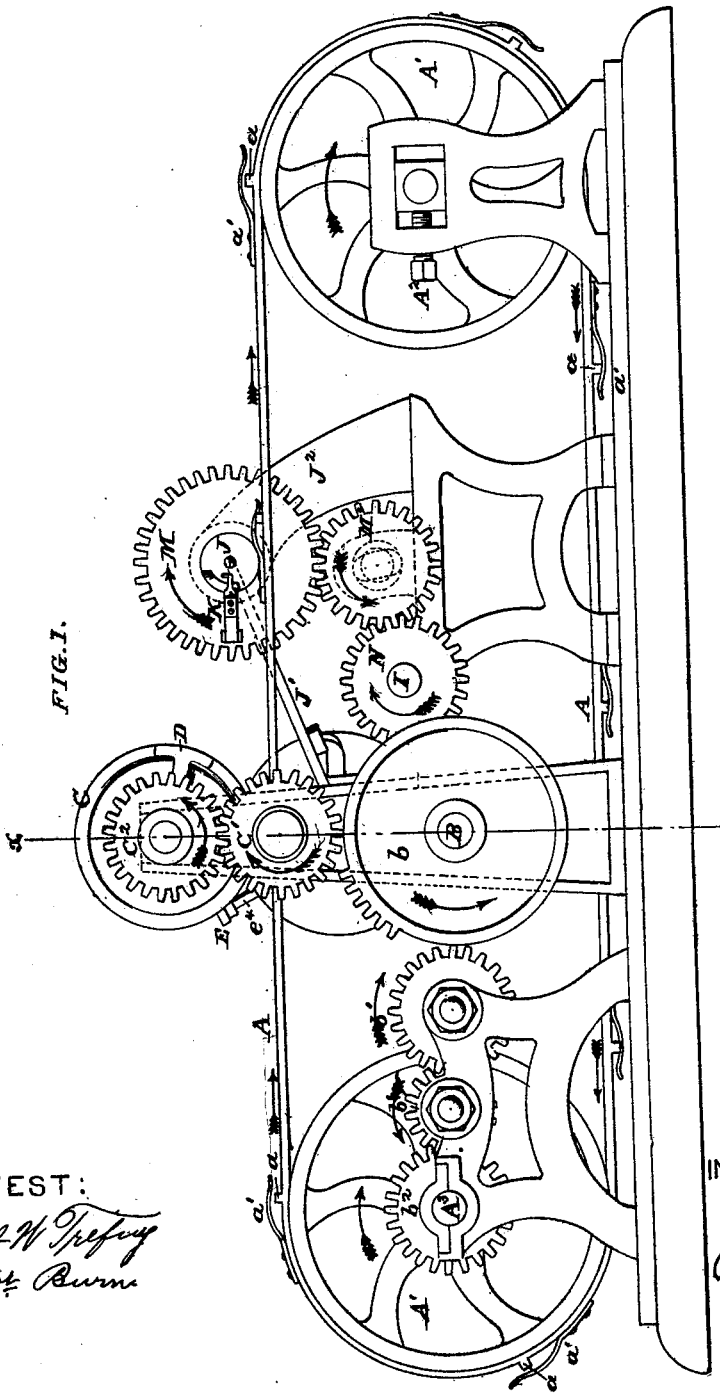

FIG. 1.

ATTEST:
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Robt. Burns

INVENTOR:
John Winter

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FIG. 3.

FIG. 2.

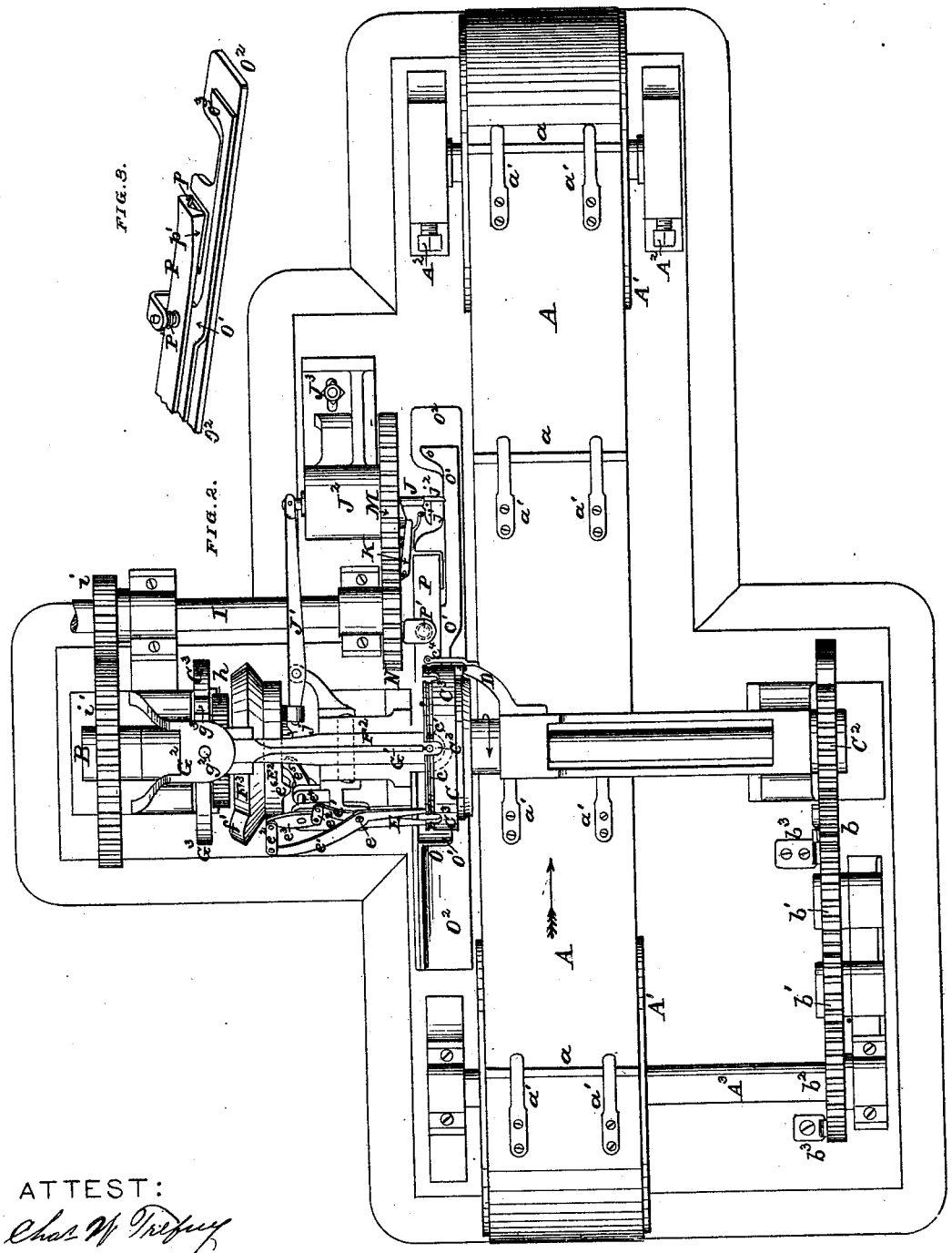

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FIG. 4.

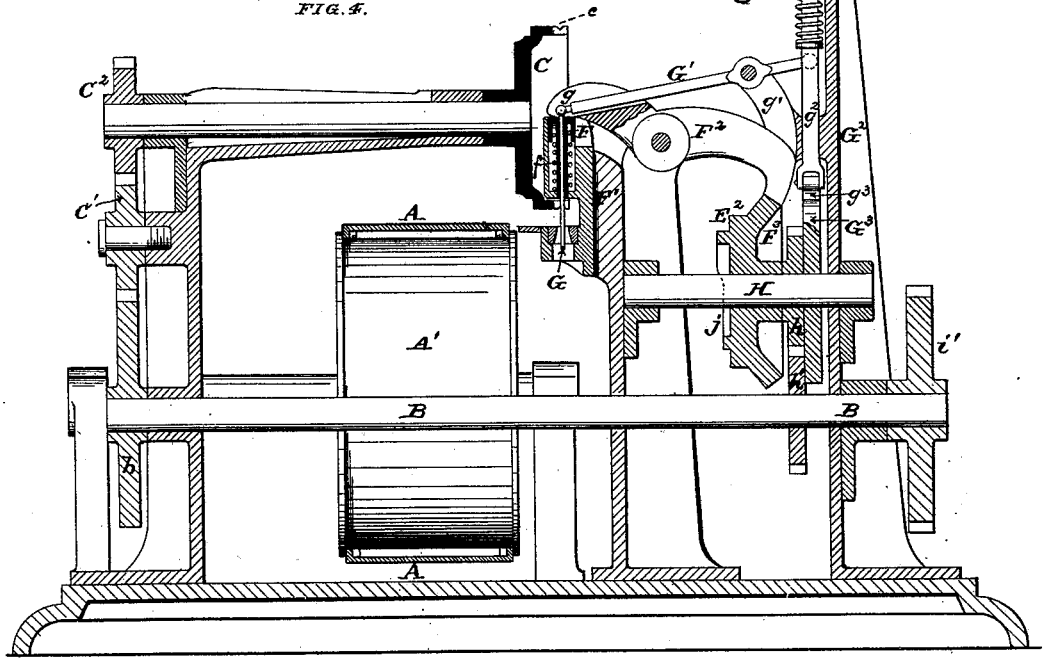


FIG. 5.

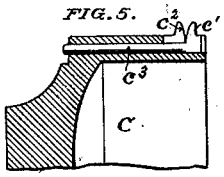


FIG. 6.

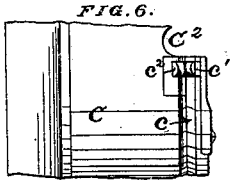


FIG. 7.

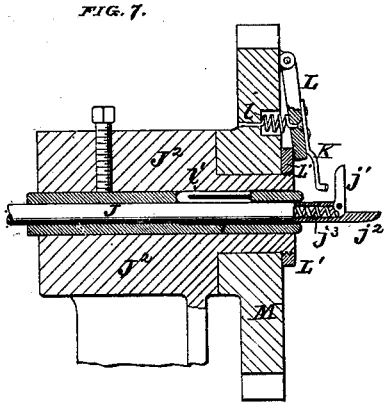
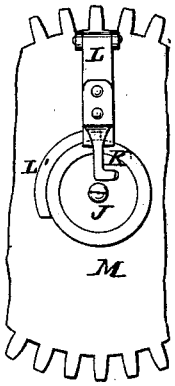


FIG. 8.



ATTEST:

Chas W Tressy
Robt Burns

INVENTOR:

John winter

UNITED STATES PATENT OFFICE.

JOHN WINTER, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF HIS RIGHT TO CHARLES MASCHMEYER, OF SAME PLACE.

IMPROVEMENT IN PUNCHING, KNOTTING, AND STRINGING MACHINES FOR TAGS, PAMPHLETS, &c.

Specification forming part of Letters Patent No. **206,758**, dated August 6, 1878; application filed April 16, 1878.

To all whom it may concern:

Be it known that I, JOHN WINTER, of St. Louis, Missouri, have invented certain new and useful Improvements in Punching, Stringing, and Knotting Machines for Pamphlets, Tags, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My improvements consist, first, in the provision of an endless belt or chain for carrying the pamphlet or tag through the successive operations of punching, stringing, and knotting, the proper intermittent motion being imparted to the chain to allow of these different operations being effected, the object being that while one pamphlet or tag is undergoing the punching and stringing operation another at the same time will be undergoing the knotting operation, and so on while one is being punched and strung another will be knotted and another discharged finished.

My invention consists, second, in the provision of an intermittently-rotating reel, which is provided with suitable spring-clasps to hold the string while it is being passed through the pamphlet or tag by means of the stringer, and said reel is provided with proper notches in its periphery, through which the shears will act to cut the string, and also through which the punch and stringer will act to punch and string the article operated on. The spring-clasps hold one end of the string-section while the other end is being forced through the article operated on, and the clasps will then be operated to release the string-section by means of a fixed cam-plate, in order to allow it to pass to the knotter.

My invention consists, third, in a hollow punch, inside of which is arranged the stringer, which is so arranged that after the punch has operated and returned to its original position the stringer will then take hold of the section of string and carry one end of the same through the article already punched, the time between the action of the punch and stringer being sufficient to allow the reel already mentioned to bring a section of string into position for the stringer to force one end of it through the tag or pamphlet operated on.

My invention consists, fourth, in the combination, with the reel before mentioned, of an automatically-operating shears, which at proper intervals will sever the string carried on said reel into proper string-sections, which, by means of the stringer, will be passed through the tags or pamphlets operated on, as will hereinafter more fully appear.

My invention consists, fifth, in a rotary forceps, which grasps the end of the thread-loop as the pamphlet or tag comes from the stringer, and which winds said ends around a knotting-spindle to form a knot, as will hereinafter more fully appear.

My invention consists, sixth, in forming said forceps on the ends of a spring-arm which bears against a suitably-shaped fixed cam, so that as said arm rotates it will make one coil of the string around the knotting-spring and another coil across said last coil, and leave the end of the loop in a self-acting jaw or catch of the knotting-spindle, so that when the tag or pamphlet is drawn away the end of the string will be drawn into a knot.

My invention relates, seventh, to certain details of construction by means of which the various parts are automatically operated to perform their various functions.

Referring to the drawings, Figure 1 is a side view of the machine. Fig. 2 is a plan view. Fig. 3 is a detail perspective view of the spring-guide that guides the string to the knotter. Fig. 4 is a transverse vertical section on line *x x* of Fig. 1. Fig. 5 is a detail section of the spring-clasps for holding the string-sections. Fig. 6 is a detail plan of same. Fig. 7 is a detail section of the knotting-spindle forceps. Fig. 8 is a detail elevation of same.

A is the endless belt or carrier for holding the tag or pamphlet to be operated on. This belt is carried on drums A^1 A^1, which may be provided with notches to receive projections on the belt, so as to prevent any slipping of the same on the drums.

At proper intervals (or the distance traveled by the belt at each of its intermittent motions) on the face of the endless chain or carrier are arranged gage-bars, against which the article to be operated upon is placed, and

the articles so placed are held firmly in position by spring-clasps a' secured to the belts, as shown in Fig. 1.

Two spring-clasps are shown for each bar; but three or more may be used.

The journal of one of the drums is made adjustable by a set-screw, A^2, so as to take up any slack of the endless carrier A.

The endless carrier A has an intermittent motion imparted to it in the following manner: On the main shaft B of the machine is a mutilated spur-gear, b, which gears with and drives the gear-wheel b^2 on the drum-shaft A^3 through the idler-gears b^1 b^1, the purpose being to impart, from a continuously-rotating shaft, B, an intermittent motion to the endless carrier A, so as to enable the same to carry the pamphlet or tag to the puncher and stringer, and remain stationary while the same is being punched and strung, and then to again move to carry the same to the knotting device, at the same time bringing a fresh article to the puncher and stringer, and so on at each intermittent movement. The face of gear-wheels b^2 and b^1 are notched, and are locked in position at the proper time by spring-dogs b^3. In the same manner the mutilated spur-gear b imparts an intermittent motion to string-carrying reel C through an idler-pulley, C^1, and gear C^2. This reel C is formed with a groove, c, on its outer surface to receive the string from a spool or other suitable device, and equidistant in said groove are arranged three spring-clasps, c^1, which engage and hold the string, and at suitable intervals of time are opened to allow the string to escape, as will be referred to hereinafter. These spring-clasps consist of a fixed jaw, c^2, and a spring-jaw, c^1, which has a stem, c^3, projecting through the side of the reel C, so as to be operated at the proper time by the fixed cam-plate D, so as to open and allow the string to escape.

The periphery of the reel C is formed with six equidistant notches, c^3, three of which are used to allow for the passage of the shears in cutting the string, and the other three for the passage of the punch and stringer.

The string is guided to the groove c by the fixed guide-eye c^4, and therefore the thread-spool can be placed at any desired point on the machine.

The shears consist of two jaws, E E, pivoted at e, and having their arms e^1 connected by links e^2 with the rock-arm e^3 on a shaft, e^4, which shaft is provided with an arm, e^5, which bears against the cam-wheel E^2, and is operated by a cam-projection, e^6, of the said cam-wheel.

The punch F is made hollow for the passage of the stringer-rod G, and said punch slides vertically in the housing F^1, and is forced upward by a spring, f, within the housing. The punch is forced downward by a pivoted lever, F^2, which is operated by the cam-projection f' of the cam-wheel F^3.

The stringer-rod G is connected to its operating-arm G^1 by an expansion-point, g, and said arm is pivoted to bracket g^1 of the standard G^2, and is operated by the reciprocating spring-bar g^2, which receives motion from the cam-projection g^3 of the cam-wheel G^3.

The cam-wheels E^2, F^3, and G^3 are arranged on a counter-shaft, H, which receives motion from the main shaft B by spur-gears h h'.

As a modification, the punch F can be made solid, and the stringer-rod G arranged to operate from below, in which case the stringer-rod will be provided with a hook at its upper end with which to engage the thread and draw it down through the punched hole.

The main driving-shaft B of the machine is geared with and driven by a driving-shaft, I, through gear-wheels i i', and from this driving-shaft I the knotter receives a constant rotary motion.

The knotter consists of an intermittently-reciprocating spindle, J, which is operated by the cam-ring j through the pivoted lever J^1.

The spindle J at its outer edge is provided with a spring-jaw, j^1, and a fixed jaw, j^2, the former held open by a coil-spring, j^3, and this jaw is closed to hold the ends of the string when the spindle is drawn into its housing J^2. When the spindle J is drawn within its housing J^2 the jaws j^1 j^2 are held together by a spring, l', within the housing, the purpose being to allow the string to be drawn out of said jaws without liability to straining or breaking of the parts.

K is the forceps, formed with spring-jaws to receive the ends of the string, and which rotates around the spindle J, so as to wind the string around said spindle. This forceps K is secured to a hinged bar, L, which is drawn inward by a spring, l, and has its end resting against a cam-plate, L′, secured to the housing of J^2 of the spindle.

The purpose of this cam is to move the forceps so that it will place a loop around the spindle, and then place another loop across the said loop, and leave the ends of the string in the jaws j^1 j^2, so that as the pamphlet or tag is drawn away from the knotter a knot will be formed on the string.

The forceps K, with its carrying-bar L, is hinged to the face of the spur-gear M, which is driven through an idler-gear, M′, by the gear N on the driving-shaft I.

The pamphlet or tags are guided and held by passing through the fixed guide-throat O, formed of an upper and under plate, O^1 O^2.

P is a spring-plate, having its end formed with a V-shaped notch, p, at its end, through which the string ends pass and are brought together so that they will be brought into proper position to be caught by the twisting-forceps K. This plate P is also formed with an inclined lip, p', so that as the pamphlet or tag passes under it the plate will be raised so as to allow the passage of the article.

The upper plate O^1 extends back of the knotter, as shown, and is provided with curved portion O^3, under which the string passes as it comes from the knotter, and is held so as to

prevent the jerking of the article that would otherwise occur.

P′ is a spring for holding the spring-plate P down on the pamphlet, &c., and the bracket that carries the spring may be made adjustable, so as to regulate the tension of the spring.

The rear end O^3 of the plate O^1 will lie flat on the plate O^2 when it is not lifted up by a pamphlet passing between them.

The operation of this machine is a follows: Motion is imparted to the driving-shaft B through the counter-shaft I, which sets the machine in motion, and as the endless carrier A brings around its gage-bars *a* and spring-clasps *a′* in the direction indicated by the arrows a pamphlet is placed in the same while the spring-clasps are up, as shown to the left in Fig. 1. As the endless carrier moves forward the clasps come down to hold the pamphlet in place, and this placing of the pamphlet is made every time the endless carrier brings one set of its gage-bars and spring-clasps up at the left-hand side of the machine. The carrier, as it moves forward, brings the pamphlet under the puncher F and stringer G, and then comes to a stop until the puncher and stringer have operated, the intermittent motion of the carrier being accomplished by the mutilated pinion *b* on driving-shaft B imparting, through the idler-wheels b^1 b^1, the required movements to the drums of the endless carrier.

While the endless carrier is stationary the punch F descends and punches a hole in the pamphlet, and again returns to its "up" position through the action of cam *f′*, rock-arm F^2, and spring *f*. The thread-carrying reel C is then operated in the direction indicated by the arrows by means of the mutilated pinion *b* through gears C^1 C^2, so as to bring a section of the string contained in its groove *c* under the stringer-rod G, which then descends and forces one end of the string through the hole in the pamphlet, a section of the string having been cut off by the shears E while the stringer was descending. The end of the string severed by the shears, being free, is forced by the stringer down through the hole in the pamphlet, the other end being securely held by the spring-clasps c^1 c^2, which are operated at the proper time to let go of this end of the string by the fixed cam-plate D, which acts to force the jaws of the spring-clasp open as they are brought near it by means of the projecting shank c^3 of the jaw *c*, and this opening of the spring-clasp is effected after the stringer has returned to its original position and before the endless carrier begins to again move.

The operating mechanism of the shears and stringer and their actions are fully set forth in the descriptive part of the specification.

The carrier A again moves to bring a fresh pamphlet to the puncher and stringer, and to carry the already punched and strung pamphlet to the knotter mechanism. As the pamphlet is being carried back to the knotter it passes under the spring-plate P, and after the pamphlet has passed said plate the ends of the string will be caught by the V-shaped notch *p* at the end of said plate, and held in position to be engaged by the spring-jaws of the forceps K as it comes around under the string ends. The forceps-jaws take hold near the forward end of the string and rotate around the knotting-spindle, so as to lay a loop on said spindle, and then another loop across the one already made, which is accomplished by the fixed cam L′ and spring *l*, which move the forceps in and out as it rotates, so as to lay the coils as above described.

After the coils are thus laid the forceps lays the string ends in the jaws j^1 j^2 of the knotting-spindle, which at this moment is drawn into its housing, which closes the jaws to hold the string end, while the loops or coils of the string are partly forced off by the housing and partly drawn off by the pamphlet as it is carried back by the endless carrier. The spindle is drawn into its housing by its operating-cam *j* and lever J^1 so far as to bring its spring-jaw j^1 under a stiff spring, *l′*, which acts to retain said jaw closed until too strong a tension is brought on the string, when it will allow the jaw to open and release the string.

While the knotting-spindle is being drawn into its housing the endless carrier again moves, carrying the pamphlet with it so as to draw the knot made by the knotter tight, and then carry the pamphlet back to the rear end of the machine and discharge it.

It will be seen that the action of the machine is continuous—*i. e.*, one pamphlet will be undergoing the punching and stringing while another is undergoing the knotting operation and still another is being discharged from the machine finished.

Having thus fully described my invention, what I claim is—

1. The thread-carrying reel C, having a series of notches, C^3, in combination with the punch F and stringer G, substantially as and for the purpose set forth.

2. The thread-carrying reel C, having a series of notches, c^3, in combination with the punch F, stringer G, and shears E, substantially as and for the purpose set forth.

3. The shears E, having its arms c^1 connected to the rock-arm e^3 by links e^2, in combination with the cam-projection e^6 and arm e^5, substantially as and for the purpose set forth.

4. The thread-carrier reel C, having thread-groove *c*, in combination with the fixed jaw c^2, spring-jaw c^1, stem c^3, and fixed cam-plate D, substantially as and for the purpose set forth.

5. The hollow punch F, through which passes the stringer G, in combination with the thread-carrier reel C, having notches C^3, and the endless carrier A, substantially as and for the purpose set forth.

6. The combination of the carrier-wheel M, forceps K, cam L′, spindle J, jaws j^1 j^2, lever J^1, cam *j*, and housing J^2, substantially as and for the purpose set forth.

7. The spindle J and jaws j^1 j^2, in combina-

tion with spring l' and housing J^2, as and for the purpose set forth.

8. The combination of the carrier-wheel M, bar L, spring l, forceps K, and fixed cam L', as and for the purpose set forth.

9. The combination of the knotting device J K, &c., with the spring-plate P, having a V-shaped notch at its rear end, substantially as and for the purpose set forth.

10. The combination of the fixed guide-throat O, formed of plates O^1 O^2, with the reel C, punch F, stringer G, and carrier A, substantially as and for the purpose set forth.

11. The endless carrier A, in combination with the rotary thread-carrier C, punch F, stringer G, and knotter K J, as for the purpose set forth.

JOHN WINTER.

Witnesses:

CHAS. W. TREFNY,

ROBERT BURNS.