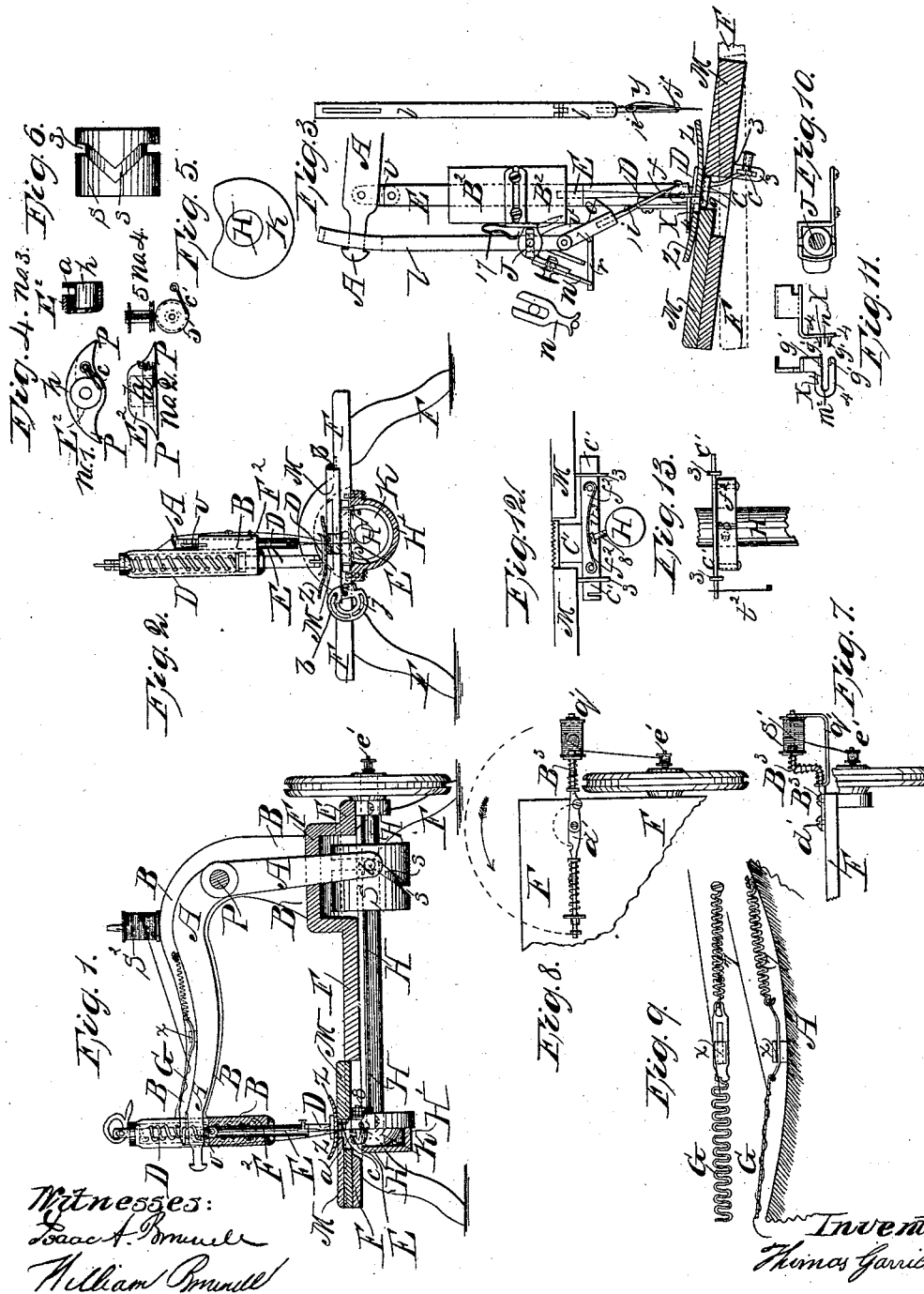


T. GARRICK.
SEWING MACHINE.

No. 111,447.

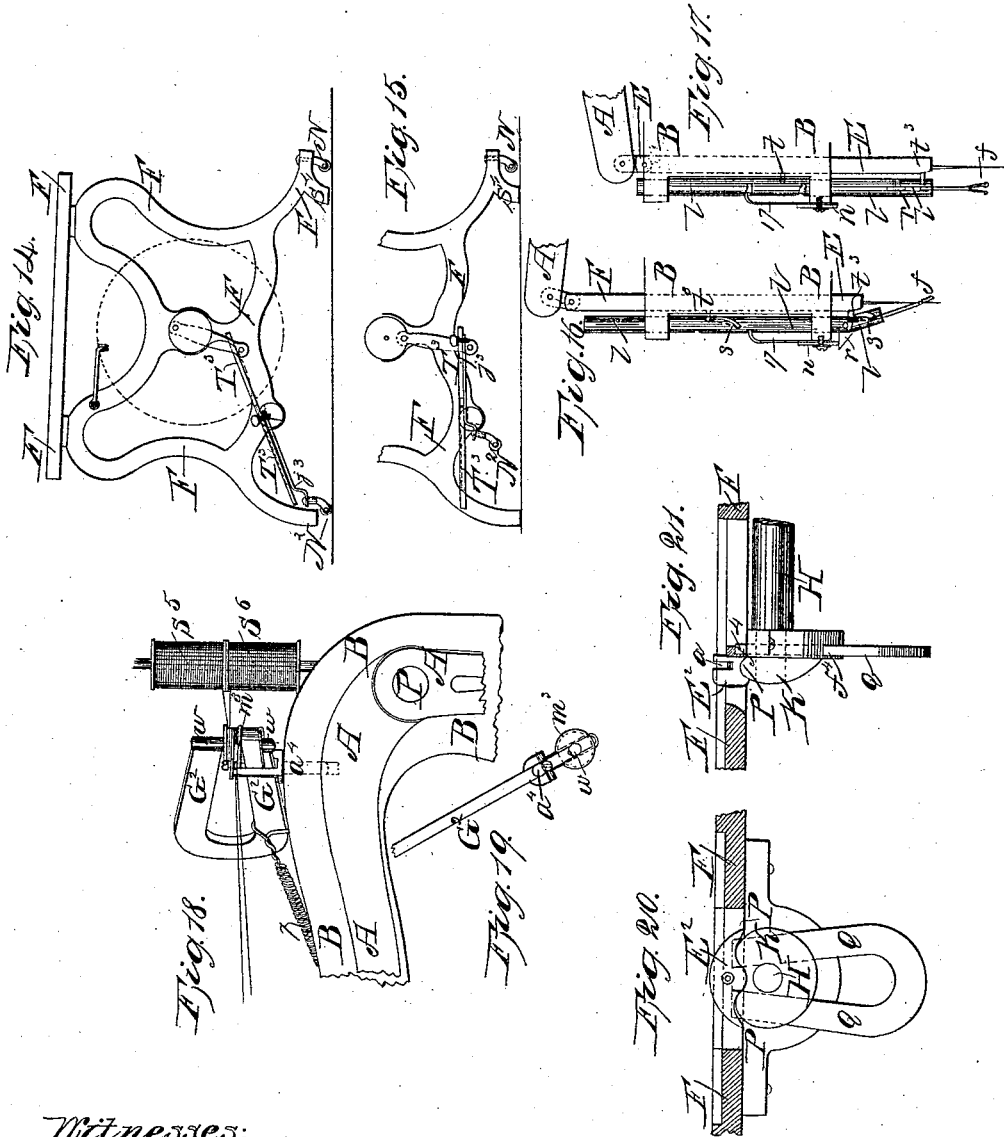
Patented June 31, 1871.



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Letters Patent No. 111,447, dated January 31, 1871.

IMPROVEMENT IN SEWING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, THOMAS GARRICK, of the city and county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Sewing-Machines and Button-hole Attachment for the same; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a side elevation of a sewing-machine embodying my said improvement.

Figure 2 is a front elevation of the same.

Figure 3 is a side elevation of the button-hole attachment in connection with the immediate sewing part.

Figure 4, No. 1, is a side view of my improved shuttle; No. 2 is a plan view of the same; No. 3 is a cross-section; and No. 4 is a plan and an end elevation of my shuttle-bobbin.

Figure 5 is a front-view of the rotating shuttle-carrier.

Figure 6 is a view of the cam which operates the needle-bar and the parts deriving motion therefrom.

Figure 7 is a side elevation, and

Figure 8 is a plan of the apparatus for winding the thread on the shuttle-bobbin.

Figure 9 is a plan and a side elevation of the tension apparatus for the needle-thread.

Figure 10 is a plan of the swivel I, hereinafter mentioned, for supporting the button-hole apparatus.

Figure 11 is a plan and an end view of the button-hole guide and spreader hereinafter mentioned.

Figure 12 is a front elevation, and

Figure 13 is a plan of the feeding apparatus.

Figure 14 is an end elevation of the frame and table of a sewing-machine furnished with my new arrangement of the casters for readily moving the machine from place to place.

Figure 15 represents the casters in a different position, illustrating the manner of using the same.

Figure 16 and Figure 17 represent a modification of the button-hole apparatus in two positions of its operation.

Figure 18 is an elevation of my improved magnetic tension apparatus.

Figure 19 is a top view of the same.

Figure 20 is a front elevation and section, and

Figure 21 is a side elevation and section of my improved magnetic apparatus for controlling the operation of the shuttle.

Similar letters and characters indicate like parts in all the figures.

The first part of my invention relates to the means employed for producing the requisite tension of the needle-thread, and consists of a serpentine grid or

rack formed by bending a rod or wire zigzag to receive between some of its turns one or a number of turns or bights of needle-thread, and a take-up device connected with said rack consisting of a spring or its equivalent, which will yield to the pulls upon the thread, and by its reaction take up any after slackness which may result from the operation of sewing from a continuous thread.

My invention also relates to the means for holding the fabric to be operated upon by the button-hole stitching apparatus obliquely to the needle, and consists of a tilting presser, plate, and feed, and a tilting presser and suitable means for confining the same at the proper angle of inclination, so that the needle will enter the fabric near the edge of the button-hole and pass obliquely through at some distance from the edge on the under side, so as to prevent pulling out or unravelling the fabric by the strain on the thread in whipping over or binding from the under side of the fabric.

My invention also relates to the means employed for spreading and guiding the button-hole beneath the needle, and consists in the combination with the vibrating loop-catcher, arranged and operating as hereinbefore indicated, of a combined gauge and spreader, in the manner and for the purposes herein-after specified.

My invention also relates to the means employed to insure certainty of operation of the shuttle to catch the loop of needle-thread, and consists in combining and arranging a magnet in the shuttle-race with a non-conducting shield in the plane of the needle and between the magnet and the shuttle, and a shuttle of or faced with steel or some other good conductor, in such a manner that the magnet will attract the shuttle so that its point will pass close to the needle resting against the said shield without touching and being retarded by the magnet, and the more surely catch the loop of thread from the needle and pass through it to form a stitch.

My invention also relates to the application of magnetic attraction to produce the requisite tension of the needle-thread; and consists in combining and arranging with a tension roller, having a suitable pivot or axis, a horseshoe magnet, applied to such pivot or axis in a manner to retard the turning of the same against the surface of the magnet by the attraction between the two parts, so that a suitable tension is produced upon the thread which is coiled around the said roller and delivered therefrom to the sewing mechanism.

My invention also relates to an improved arrangement of the casters or wheels upon which the machine is wheeled or trundled from place to place, and consists of a pair of casters at the rear of the rear stands

of the frame, and a movable and adjustable caster arranged upon the treadle or otherwise, so that, by shifting the position of the movable caster, the weight of the structure may be transferred from the stands of the frame to the said casters, and be moved out of the way when not required for use.

My invention also relates to the arrangement of mechanism for winding the shuttle-bobbins and a spool-holder for the same, and consists of a screw-stud upon some revolving part of the machine, to turn and wind the bobbin, and a swinging spool-holder that will swing into a convenient position to deliver the thread upon the bobbin, and out of the way when not required for use.

To enable others skilled in the art to make and use my invention, I will proceed to describe the construction and operation or the same, as follows:

F F in the drawing is the frame and table of the machine and B is the stand thereon, in the end of which is arranged the shank D' of the spring-presser D, which assists to hold the fabric during the sewing operation, and which will be more particularly described hereafter.

A is the vibrating arm which operates the needle-bar E, for which purpose said arm is pivoted at P, and has a stud, *t*, which traverses the groove *s* in the cam S on the driving-shaft H, from which the movement of the vibrating arm is thus derived to be transmitted to the needle-bar E that slides vertically in the guide F² at the end of the stand B, said needle-bar and arm being connected for this purpose by the link *v* with the said arm bearing on the top of the needle-bar to carry it down, and the link *v* so pivoted to each as to vibrate equally on each side of the needle-bar with the up-and-down movements of the arm, and thus allow the needle-bar to move freely without restraint in its vertical guide F².

The requisite tension of the needle-thread is produced by the grid or rack G on the vibrating arm A, which is formed by bending a wire or rod in a serpentine or zigzag form, as represented in fig. 9, over and under the different turns of which the needle-thread is carried with the effect that the greater the number of turns the greater the tension, and from which the thread is delivered to the needle. This grid is secured by the guide *x* to the vibrating arm; and it has a "take-up" spring, 7, attached to its end to take up the slackness of the needle-thread after it has been drawn from the spool s².

The shuttle, fig. 4, it will be seen, has the form of a regular curve on one side, and is otherwise shaped to fit into the recess of the rotary shuttle-driver K, fig. 5, to the circumference of which the top curved side of the said shuttle very nearly conforms.

The shuttle has two pointed ends, *p p*, and a circular cavity or barrel, *h*, for containing the bobbin of shuttle-thread, No. 4, in a position crosswise or at right angles to the direction in which the shuttle moves. The shuttle is also formed with an aperture or opening, *a*, in the top side, in the barrel *h*, for the purpose of catching the loop as it passes over the shuttle by a peculiar instrument devised for the purpose, in a manner to be hereinafter described in the proper connection.

The shuttle-bobbin has a score or groove in its head, 5, in which the spring-finger *c* presses to restrain the bobbin from turning freely, and by that means producing a degree of tension of the shuttle-thread as is required for sewing purposes.

The shuttle-driver K is a circular plate or hub of metal, with a recess in its periphery suited to receiving and carrying the said shuttle in either direction, as shown in figs. 1, 2, and 5. Both shuttle-driver and shuttle are inclosed in a circular box, H¹, which serves as a shuttle-race to guide the movements of the shuttle. The shuttle-driver is secured on the end of the

driving-shaft H, from which it derives its rotary motion.

The fabric *z* to be sewed is held, as usual, between the presser and the cloth-plate, and resting on the latter, both being or lying horizontal for all ordinary sewing. When, however, it is desired to sew the button-hole stitch for the binding of the edges of button-holes, the fabric should be held obliquely to the plane of the needle, and an additional mechanism is required to catch and spread the loop of needle-thread beneath the needle, as it descends to form the succeeding loop, so as to form the knot on the upper edge of the button-hole and the binding of the under edge.

The mechanism for this purpose is clearly shown in fig. 3, and a modification thereof in figs. 16 and 17. It consists of a jointed bar, *l*, having a vertical movement in a swivel bearing, J, (also shown separately in fig. 10,) derived from the end of the vibrating arm A, which extends through a slot in the upper end of the bar *l*, which slot is somewhat elongated to provide for a rest or suspension of the movement of the bar at the end of each stroke, and the bar is held stationary while thus at rest by the spring 17, the free end of which shuts into a notch cut in the bar *l*, and holds it until the superior force of the vibrating arm moves it on to perform its operation.

The lower portion of the bar *l* is jointed to the upper, and contains the loop-catcher *f*, which, with this portion of the bar, has a vibratory motion from the shuttle when it catches the loop to the opposite side of the needle, where it transfers and spreads the loop for the needle to pass through.

This vibratory motion is produced by the projecting rod *r* on the bar *l*, which, in making its upward stroke, brings the rod *r* in contact with the adjustable stop *n*, which causes the jointed end of the bar and the loop-catcher to swing into the position shown in fig. 3, to spread the loop beneath the needle. The return vibratory movement from this position, for the purpose of catching the loop, is accomplished by means of the spring *v*, which, as the bar *l* descends, presses the lower portion into line with the upper sufficiently to bring the loop-catcher over the opening in the shuttle, from which it seizes the loop.

The needle-bar also assists to perform this vibratory movement by its lower end coming in contact and sliding upon the inclined projection *o*, which swings the loop-catcher positively to the position required for catching the loop from the top of the shuttle.

The loop-catcher consists of a double hook or two hooks with their shanks connected in a swinging-joint, *i*, and subjected to the action of a spring, *y*, to keep them together. There may be either distinct hooks or a series of barbs or beards on the extremity of the loop-catcher, and these may extend at right angles, or opposite to or the same way, each with the other, as may be found to operate with the most precision or certainty; and the loop is transferred beneath the needle in such a manner that the needle meets and passes between the two-jointed hook shanks of the loop-catcher, which spreads them apart, also at the same time spreading the loop held by the two hooks, and as the needle enters the spread loop the said hooks withdraw from it leaving it wholly with the needle, and to be drawn down snugly into the button-hole knot with the next ascending movement of the needle.

In order that the loop-catcher may not be obstructed in its movements in passing, as it is obliged to do, through the button-hole to the shuttle and return with the loop in forming each stitch, I employ a gauge or spreader, X, shown applied in fig. 3, and separately in fig. 11, which is secured to the presser, and has an opening, *m*², in the foot-plate 4, and beneath, on each side of said opening, two projecting

prongs, *g' g'*, which enter and press against the sides or edges of the button-hole and keep it extended open, so that the loop-catcher may freely pass through; and as the said prongs determine the position of the button-hole, if the said gauge-piece be made adjustable, the edge of the button-hole may, by it, be held and delivered, so that the needle will operate at a regular and definite distance from the edge, and thereby contribute to and insure uniformity in forming the successive stitches of the button-hole, and the regularity in the line of the knots of the row of stitches around the edges, and thus the said gauge serves a two-fold purpose.

The fabric in which the button-hole is to be wrought is held at an angle with the movement of the needle, in order to take up a greater quantity or width of the lower edge than of the upper edge of the seam in the compass of the stitches to bind over the under edge, while the upper edge is protected by the line of drawn knots.

This is accomplished by means of the tilting cloth-plate *M*, and tilting presser *D*, the former being hung upon pivots *b b* at each side, fig. 2, and tilted on these pivots to the required angle of obliquity by means of the tilting button or cam *j*, which, by turning on its pivot 2, tips and holds the cloth-plate at any desired angle for the purpose.

The foot of the spring-presser *D* is also pivoted to its stem *D'*, so that, by the pressure of its spring, it will conform to the inclination of the cloth-plate.

The feed-bar *C* being arranged with the cloth-plate, also conforms to its inclined position.

This feed-bar and the mechanism which operates the same, are shown in figs. 12 and 13. It is arranged to slide in the hangers 3 3 under the presser-plate, and is operated by the revolution in either direction of the screw-stud pin 8 on the main shaft *H*, which strikes against the projection *V*³ on the spring *f*², and is carried or moved in the direction which the stud-pin revolves, which moves the cloth also in the same direction, the stud-pin first striking against the said spring and lifting it and the feed-bar against the spring-presser *D*, then by contact with the projection *V*³, carrying the feed-bar and the fabric along, and after this passing the said projection and from beneath said spring, and allowing it and the feed-bar to fall and release its hold on the fabric, and to return by the reaction of the spring *f*² preparatory to a succeeding movement to advance the fabric, thus accomplishing the successive movements and effect of which is known as the "four-motion feed."

To insure greater certainty of operation of the shuttle to catch the loop of needle-thread in rapidly passing the needle, I have employed a magnet at the opposite side of the needle, that by its attraction for the shuttle would keep its point close as possible to the needle, so that the loop at its side would surely be caught.

This I have accomplished by the arrangement shown in figs. 20 and 21, in which—

K is the shuttle-driver;

*E*² is the shuttle; and

Q is the magnet.

Between the magnet and the shuttle there is a thin shield, *f*⁴, of brass or some other non-conductor, against which the shuttle bears without touching the magnet, but being of steel, or with a face or contiguous surface of steel, or some good conductor, the shuttle is attracted by the close proximity of the magnet to bear against the said shield, which is in the same vertical plane with the needle, and in consequence guides the shuttle, subject to said attraction, so close to the needle as to insure the seizure of the loop, however rapidly the shuttle may be driven past the needle.

I have also applied magnetic attraction to produc-

ing the requisite tension of the needle-thread, in the manner shown clearly in figs. 18 and 19, in which,

*G*² is the magnet, hung to swing on a pivot, *a'*, subjected to the action of the "take-up" spring 7 to take up the slackness of the unwound thread.

*m*² is a tension-roller, having an axis, *w*, on each side, which bears and revolves against the ends of the magnet.

The thread from the two spools, *S*⁵ *S*⁵, is coiled once or twice around the said roller, and thence passes to the sewing parts. The attraction between the axis of the said roller and the magnet serves to retard the turning of the roller, and thereby creates tension between the said roller and the sewing parts suitable for controlling the delivery of the thread.

Two spools, it will be seen, are exhibited in this connection, it being my intention to sew from two or more spools in button-hole work, on account of the better binding or covering of the button-hole edges, and the evident additional durability resulting therefrom; and I purpose, if it be found practicable, to employ a large eye in the needle or number of eyes, suitable for receiving and carrying a number of threads.

In figs. 14 and 15 is exhibited my improved arrangement of the casters for readily running the machine, and transferring the weight of the frame from the stands or legs to the casters for that purpose.

*S*⁴ *S*⁴ are the rear stands or legs of the frame, and at the rear or outside of these are placed the swivel-casters *N N*.

Another caster, *N*², is attached to a sliding piece, *j*³, on the treadle *T*², or an equivalent lever, in such a manner that by sliding the caster *N*² from the position shown in fig. 15 to that shown in fig. 14, toward the front of the machine and then tilting down the heel of the treadle to its lowest point, both the front and rear legs or stands will be lifted from the floor, and the weight transferred to the casters upon which the whole structure may be wheeled away to the desired place.

A convenient device for winding the shuttle-bobbins is shown in figs. 7 and 8.

The bobbin to be wound is screwed upon a small stud, *e*, projecting from the center of the driving-shaft *H*, and the spool *S*¹ is held while delivering the thread to winding bobbin by the spool-stand or holder *B*³, consisting of a bent rod pivoted at *d'* to the table of the machine, and encircled by a spring, which exerts a force against one end of the spool *S*¹, to preserve a certain degree of tension while the spool is kept upon the pin or rod, while it revolves and delivers the thread by means of the guard-rod *g*, an eye in one end of which catches upon the end of the rod *B*³, when it is held by the pressure of the encircling spring against an eye formed at the other end.

When this spool-holder is not required for use it may be swung over the table out of the way, as shown in red lines in fig. 8.

In the modification of the button-hole apparatus, shown in figs. 16 and 17, the loop-catcher is partly rotated in transferring the loop from the shuttle to the needle. This is accomplished by means of the spiral or winding grooves *s s* that are cut into the bar *l*, and the pins *t t* which slide in said grooves by the sliding movement of the needle-bar in which the pins are fixed, the loop-catcher descending in the position shown in fig. 17, to catch the loop from across the shuttle, and in return transferring and spreading the loop beneath the needle, in the position shown in fig. 16, said loop-catcher, as represented, being merely a hooked fork without hinge or spring.

Having described my invention,

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

1. The serpentine grid or rack *G*, substantially as

described, in combination with the take-up spring 7, as its equivalent, for the purpose of producing the requisite tension and to take up the slackness of the needle-thread, as described.

2. The tilting cloth-plate M, substantially as described, in combination with a tilting presser, D, as described, for holding the fabric to be sewed obliquely to the needle, substantially as specified.

3. The combination, with a divided loop-catcher, when arranged to operate through the button-hole, substantially as herein described, of the combined gauge and spreader X, for the two-fold purpose herein set forth.

4. The combination of a rotary shuttle of the material described, with the magnet and shield of brass, or its equivalent, interposed between it and said shuttle, substantially as and for the purposes set forth.

5. The magnet, in combination with the tension-

roller, arranged and operating substantially as and for the purpose specified.

6. The combination and arrangement of the fixed and movable casters N N² with the treadle or its equivalent, substantially as and for the purpose specified.

7. The shuttle-bobbin, having a groove in its flange and combined with a spring-finger bearing in said groove, as herein described.

8. The tilting and holding cam or button j or its equivalent, in combination with the cloth-plate, as described, for the purpose specified.

9. The spool-holder B³ and the bobbin-winder, constructed substantially as described, for the purpose specified.

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