(No Model.)

E. TIFFANY.

SUPPORTING SPRING, &c., FOR STRAIGHT KNITTING MACHINES.

No. 457,061. Patented Aug. 4, 1891.

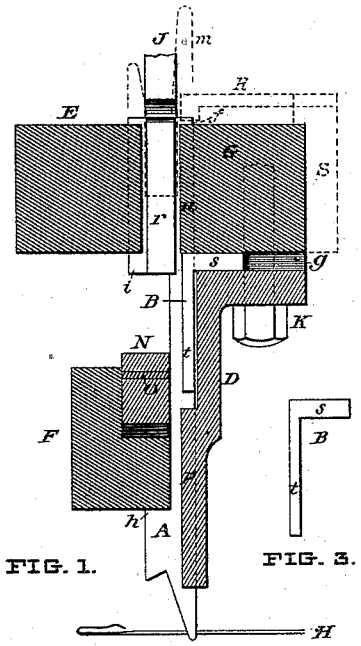

FIG. 1.

FIG. 3.

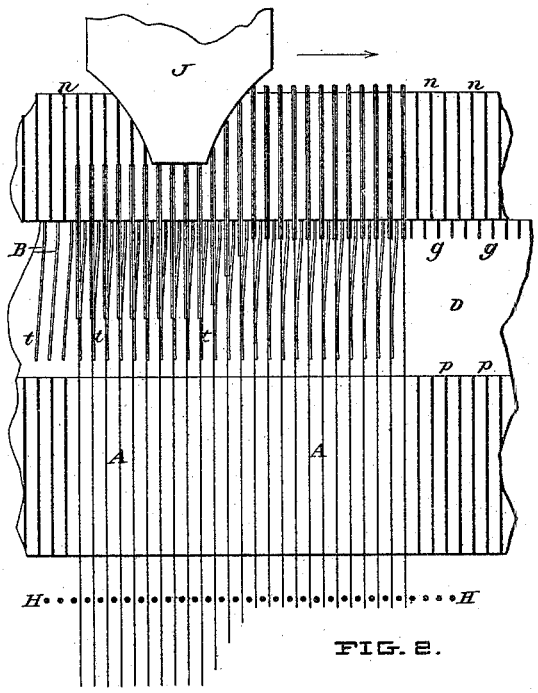

FIG. 2.

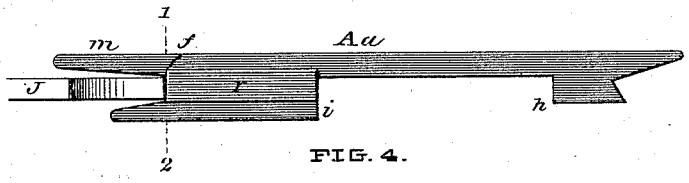

FIG. 4.

WITNESSES:

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SUPPORTING-SPRING, &c., FOR STRAIGHT-KNITTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 457,061, dated August 4, 1891.

Application filed April 3, 1890. Serial No. 346,384. (No model.)

To all whom it may concern:

Be it known that I, ELI TIFFANY, of the town of Bennington, in the county of Bennington and State of Vermont, have invented certain new and useful Improvements in Supporting-Springs, &c., for Straight-Knitting Machines; and I hereby declare that the following description, in connection with the accompanying sheet of drawings, constitutes a specification of the same.

The subject-matter of this patent is an improvement on the system of springs and bars for supporting sinkers in straight-knitting machines shown in my patents, No. 374,280, dated December 6, 1887, and No. 408,270, dated August 6, 1889.

The drawings fully disclose the invention, and in the drawings Figure 1 is a vertical transverse section of a portion of a straight-knitting machine, taken through the sinker and falling bars. Fig. 2 is a front elevation of the back sinker-bars, the front sinker-bar and the falling bar having been removed, showing the front edges of a number of sinkers and their supporting-springs. Fig. 3 is a side view of a detached spring. Fig. 4 is a side view of one of the sinkers used in existing machines, which the improved sinker herein described is designed to supersede.

By referring to the above-named patents it will be seen that the sinkers are of the form shown in Fig. 4 and are adapted to slide in vertical grooves in the opposed faces of two bars at the top end of the sinker, and in Patent No. 408,270 in another bar placed in rear of the sinkers near their lower ends. In those patents when the sinkers are lifted by the falling bar they are supported, after the falling bar drops, by the springs attached to a bar, which is attached to the upper back sinker-bar, and which springs have a lateral pressure against the sides of the sinkers in their grooves at a point coincident with the upper surface of the back sinker-bar. The springs bear against the prolongations *m* on the sinkers which run in the grooves of the back sinker-bar, as seen in dotted lines in Fig. 1. Experience has demonstrated that the blow imparted by the slur-cock J to the top of the sinker as it passes over it back and forth has the effect of starting and continuing a fracture in the main plate of the sinker, as shown at *f* in Fig. 4, so that after a limited service the top *m* breaks off at that point and the provision for the spring to bear against is lost, besides leaving the sinker free to drop down and produce damage either to the machine or the fabric. It will also be seen by reference to said patents that the sinker-supporting springs are all rigidly and inseparably attached to a transverse bar, which construction is objectionable for various reasons. One is that if one of these springs gets broken or damaged in any way, so as to require repair or replacement, the machine must lie idle while the spring-bar is detached from the machine and the defective or broken spring is repaired or removed. This operation is attended with great loss of time and expense, resulting from the fact that the springs in such machines are not readily and separately detachable without removing the bar from the machine. In the present invention these difficulties are overcome by changing the position of the spring-bar and employing independently detachable and insertible supporting-springs. To remedy these evils I have changed the form of the sinker by cutting off the two prolongations at the top of the sinker on the line 1 2, Fig. 4, thus leaving a square top, as seen in full lines in Fig. 1. This change permits the use of broader re-enforcing cheeks *r r* and a much thicker slur-cock, as is evident by comparing the one shown in Fig. 1 with that seen in Fig. 4. When the sinkers of this form are in position, their edges nearest the slur-cock when in action are always supported by the walls of the grooves in which they play. Thus breakage from the before-mentioned causes is impossible. To support the sinkers when elevated, I employ a spring B, similar in shape to those shown in the patents cited; but I have changed its position so as to utilize much of its length and thus secure a larger surface of contact where it impinges against the sinker. For this purpose I have located the spring below the upper rear sinker-bar and in rear of the falling bar. As a provision for holding these springs the back-supporting bar D is transversely grooved across that part

of its surface which forms a joint with the under side of the back sinker-bar G, as seen at *g g* of Fig. 2. These grooves fall between those in which the sinkers play, as seen at *p p*. The upper part of the bar D is rabbeted away on its face a little deeper than the depth of the grooves *p p*, so that the back edges of the sinkers shall not strike the front of bar D. This rabbet forms a recess for the tongue *t* of the spring B. The springs are fixed in position by pressing their shanks *s s s* into the grooves *g g g* of bar D, in which they are held by frictional contact, and are so constructed that when inserted their tongues are bent around to one side, as seen at the left of Fig. 2. The bar D is held in position by the bolts K, Fig. 1. The springs are not held so tightly but that they may be drawn from the grooves *g g* with pliers, so that no difficulty is experienced in making changes or repairs. The front edges of the sinkers play in grooves provided in the front sinker-bar E, a construction well understood, and the falling bar F plays between the shoulders *i* and *h* in the gap in the front edges of the sinkers in the usual manner. The lateral pressure imparted by this style of spring against the side of the sinker effects frictional contact between the opposite side of the sinker and the wall of the grooves in which it plays in both upper and lower grooves and has the effect of distributing the frictional support throughout the entire length of that part of the sinker which runs in the grooves. Less cramp on the sinker in the grooves is occasioned in action by this construction than by the old method, and as a result the sinkers and springs both wear longer.

Another advantage lies in the fact that when the falling bar is removed both sinkers and springs are accessible for change or repairs from the front of the machine. The location of the spring between the upper and lower series of sinker-grooves, so as to enable its force to be exerted upon the sinker nearly midway of its length, is quite advantageous.

It is apparent that the grooves *g g g* may be cut either in the top of the bar D or in the bottom of the sinker-bar G, or the bars D and G could be made integral and the shanks of the springs could be inserted and held in any kind of suitable sockets provided therefor in the back bar; but all such modifications involve no departure from the essence of my invention, and therefore are not specifically considered here. The dotted positions of the bar S, spring R, and prolongation *m* (shown at top of Fig. 1) are simply to show the positions of those parts in the old machines, and are here introduced simply to aid the reader in understanding the nature of the improvement.

I am aware that heretofore loose springs for supporting sinkers by frictional contact have been independently interposed between sinkers for their mutual support, and also between fixed abutments on some part of the machine and the edges of the sinkers; but all such devices lacked means of self-support when the sinker was broken or removed. The spring here shown is distinguished from all such in possessing an attaching-shank, whereby it is independently held.

I therefore claim as my invention and desire to secure by Letters Patent—

1. In combination with the sinkers of a straight-knitting machine and a bar in rear of the sinkers, a series of independently-detachable sinker-supporting springs, each having a spring-tongue adapted to bear against the sinker, and an attaching-shank adapted to be inserted in a slot or seat provided therefor in said bar in rear of the sinkers and to be held therein by frictional contact, substantially in the manner described, and for the purposes set forth.

2. The combination, with the sinkers of a straight-knitting machine, of two parallel transversely-grooved bars which form the back guides for the sinkers, and a series of independently-detachable sinker-supporting springs interposed between said bars, each having a spring blade or tongue, substantially in the manner described, and for the purposes set forth.

3. The described individual supporting-spring B, having a spring-tongue *t* and an attaching-shank *s*, in combination with a spring-supporting bar having a slot or socket for the reception of said spring-shank and in which said shank is held by frictional contact after insertion, substantially in the manner described, and for the purpose set forth.

4. The combination, in a straight-knitting machine, of a series of sinkers, a bar provided with a series of spring-shank sockets behind said sinkers coinciding with the intervals between the sinkers, and a series of shanked supporting-springs severally capable of insertion and detachment from their respective sockets, substantially in the manner described, and for the purpose set forth.

5. In combination with the sinkers of a straight-knitting machine, a structure behind the sinkers provided with the series of upper guiding-slots *n n n* and the lower guiding-slots *p p p*, and the series of individually-removable supporting-springs B, having the described spring tongues and shanks, attached and held in position by means substantially as described and set forth.

6. The combination of the sinkers A, reenforced on each side by the pieces *r r*, having square tops, substantially as shown with the broad-faced slur-cock J, bars E, G, and D, and the independently-detachable springs B, arranged to operate substantially in the manner described and set forth.

7. A spring for supporting a sinker in straight-knitting machines, having a spring blade or tongue adapted to bear against the

sinker and provided with an attaching-shank adapted to be inserted in a stationary slot in some fixed part of the machine and to be held therein by frictional contact, said springs being severally capable of removal and replacement, substantially as specified.

In testimony whereof I have hereto subscribed my name, at Bennington, Vermont, this 29th day of March, A. D. 1890.

ELI TIFFANY.

In presence of—
FRANKLIN SCOTT,
F. M. TIFFANY.