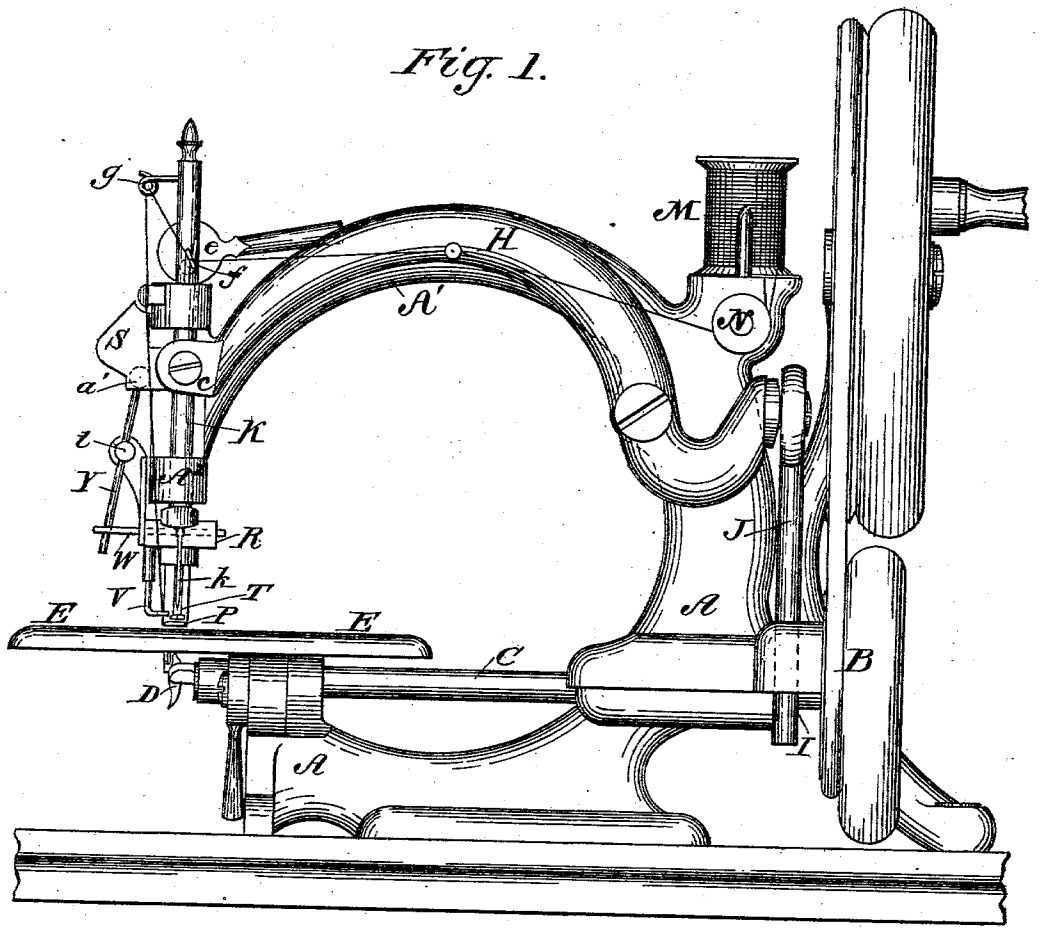
(No Model.) 8 Sheets—Sheet 1.

A. LEGG & C. W. WESTON.

SEWING MACHINE.

No. 474,840. Patented May 17, 1892.

Fig. 1.



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Dwight Bennigandge

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(No Model.) 8 Sheets—Sheet 2.

A. LEGG & C. W. WESTON.

SEWING MACHINE.

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Fig. 2.

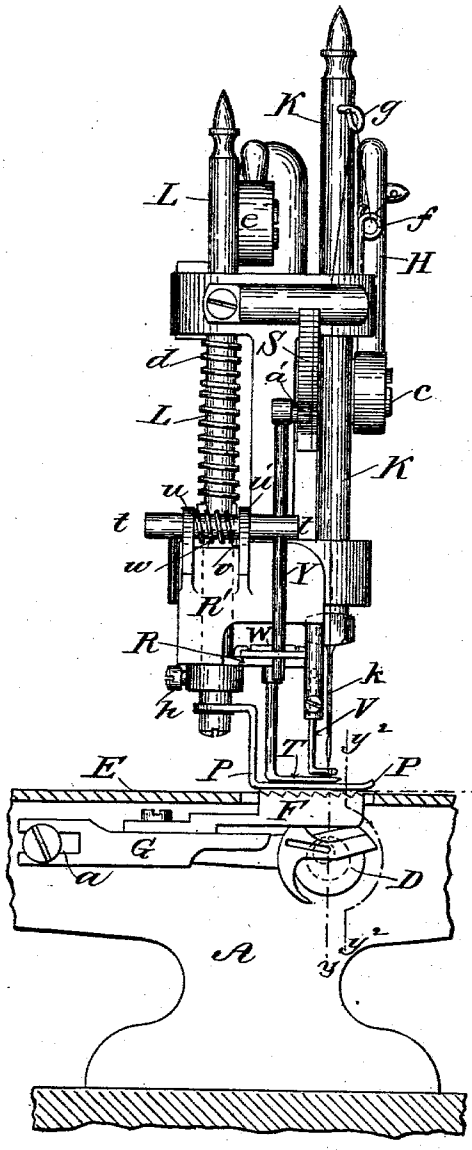

Fig. 3.

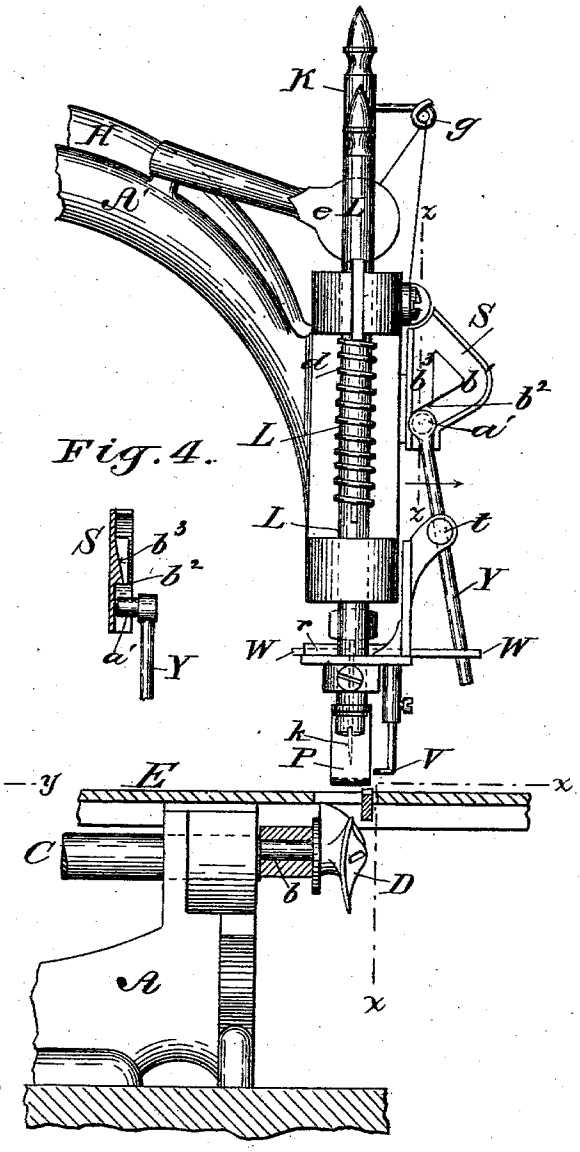

Fig. 4.

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A. LEGG & C. W. WESTON.

SEWING MACHINE.

No. 474,840. Patented May 17, 1892.

Fig. 5.

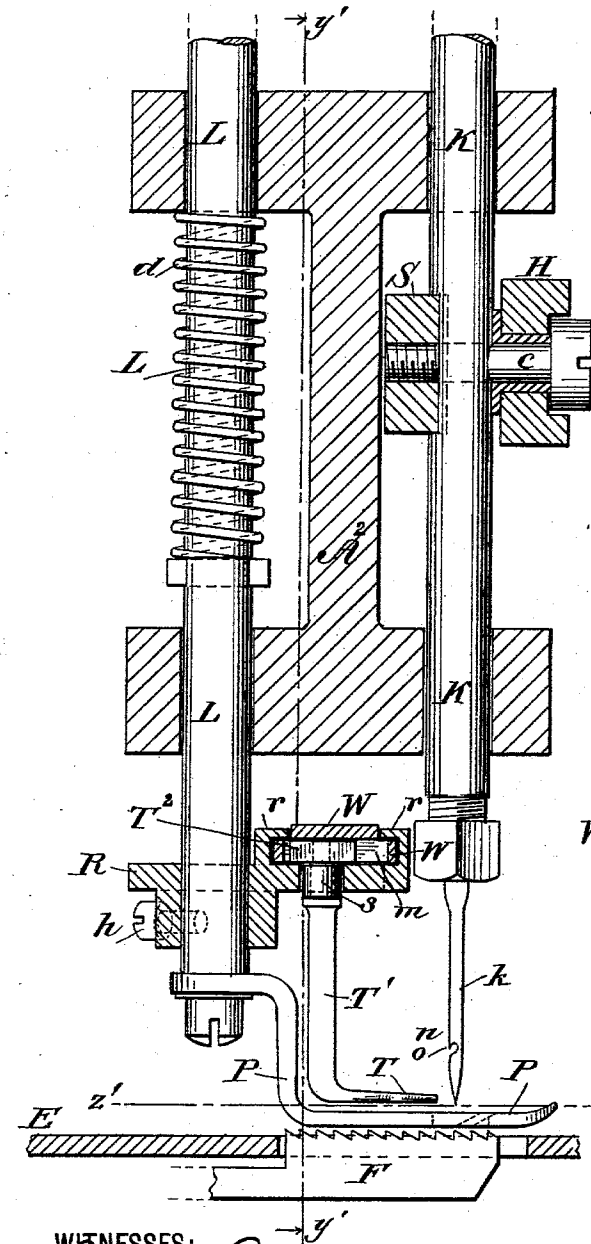
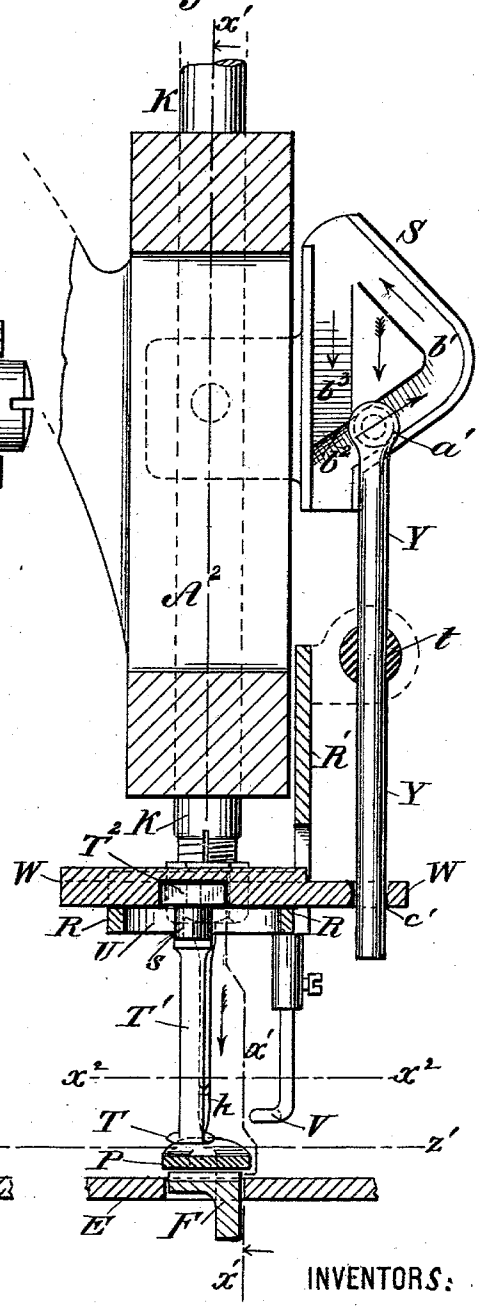


Fig. 6.



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A. LEGG & C. W. WESTON.

SEWING MACHINE.

No. 474,840. Patented May 17, 1892.

Fig. 7.

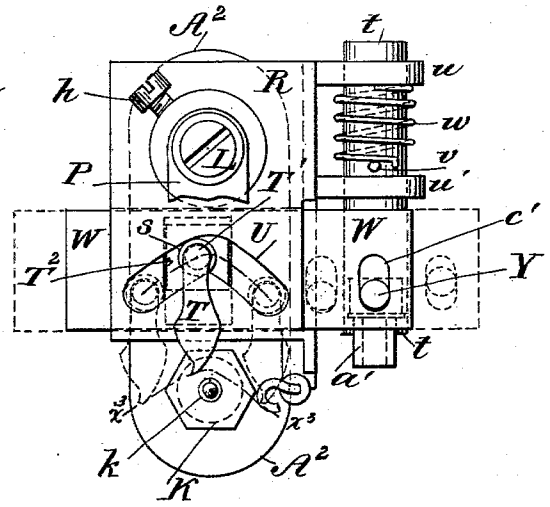


Fig. 8.

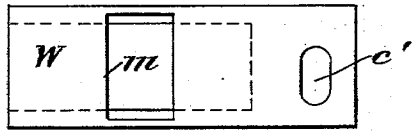
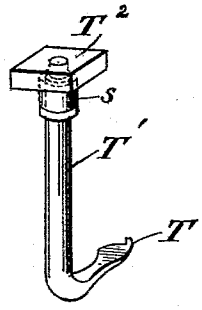


Fig. 9.



WITNESSES:

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A. LEGG & C. W. WESTON.

SEWING MACHINE.

No. 474,840. Patented May 17, 1892.

Fig. 10.

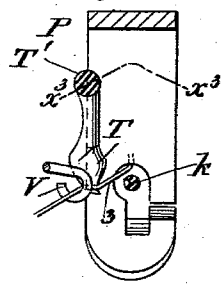


Fig. 12.

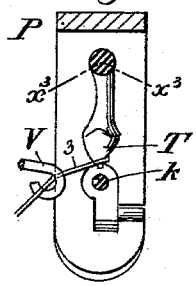


Fig. 13

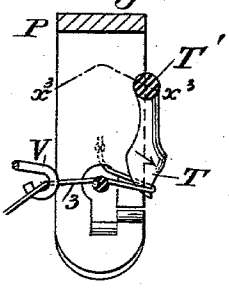


Fig. 11.

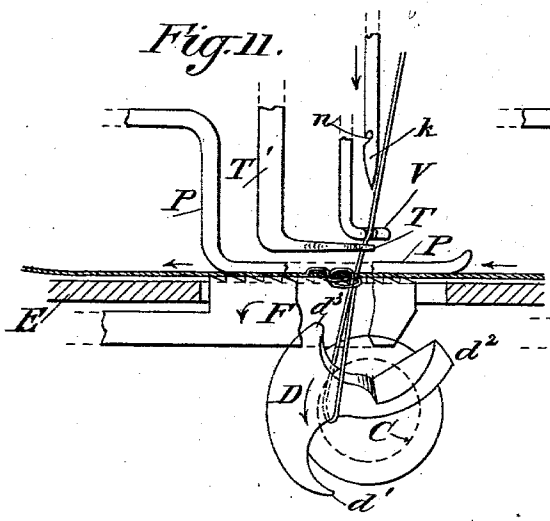
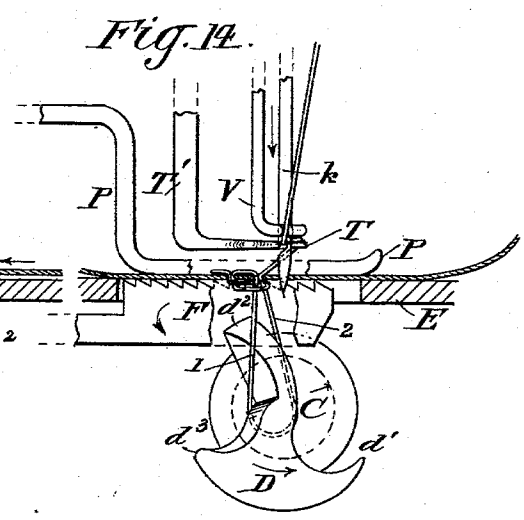


Fig. 14.



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(No Model.) 8 Sheets—Sheet 6.

A. LEGG & C. W. WESTON.

SEWING MACHINE.

No. 474,840. Patented May 17, 1892.

Fig. 15.

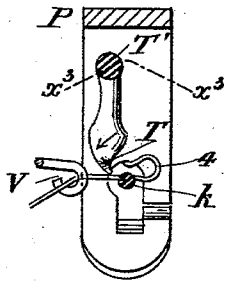


Fig. 17.

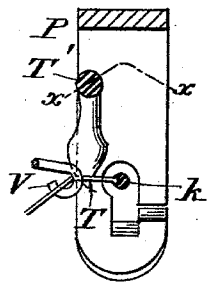


Fig. 16.

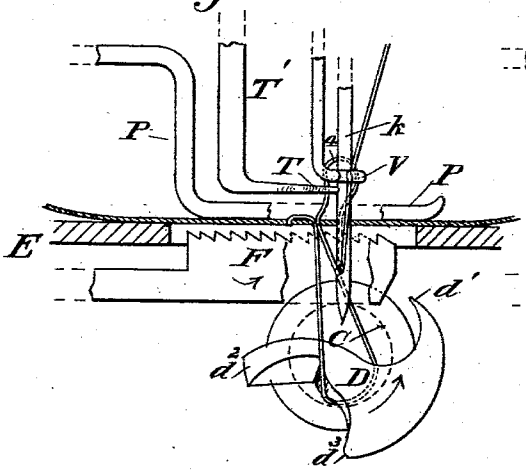


Fig. 18.

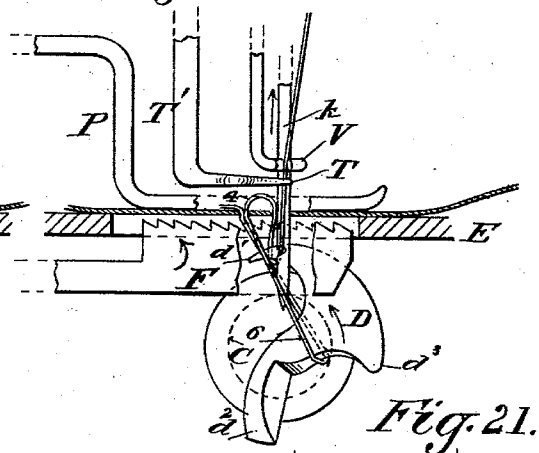


Fig. 21.

Fig. 19.

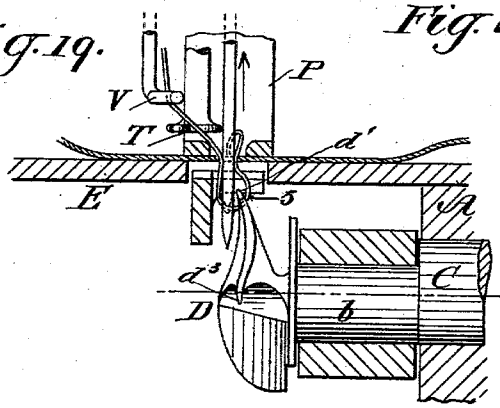
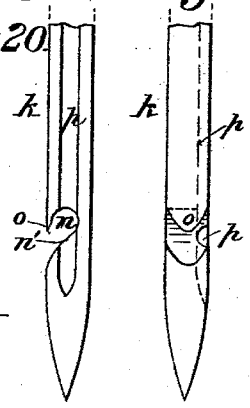


Fig. 20.



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(No Model.) 8 Sheets—Sheet 7.

A. LEGG & C. W. WESTON.

SEWING MACHINE.

No. 474,840. Patented May 17, 1892.

Fig. 22.

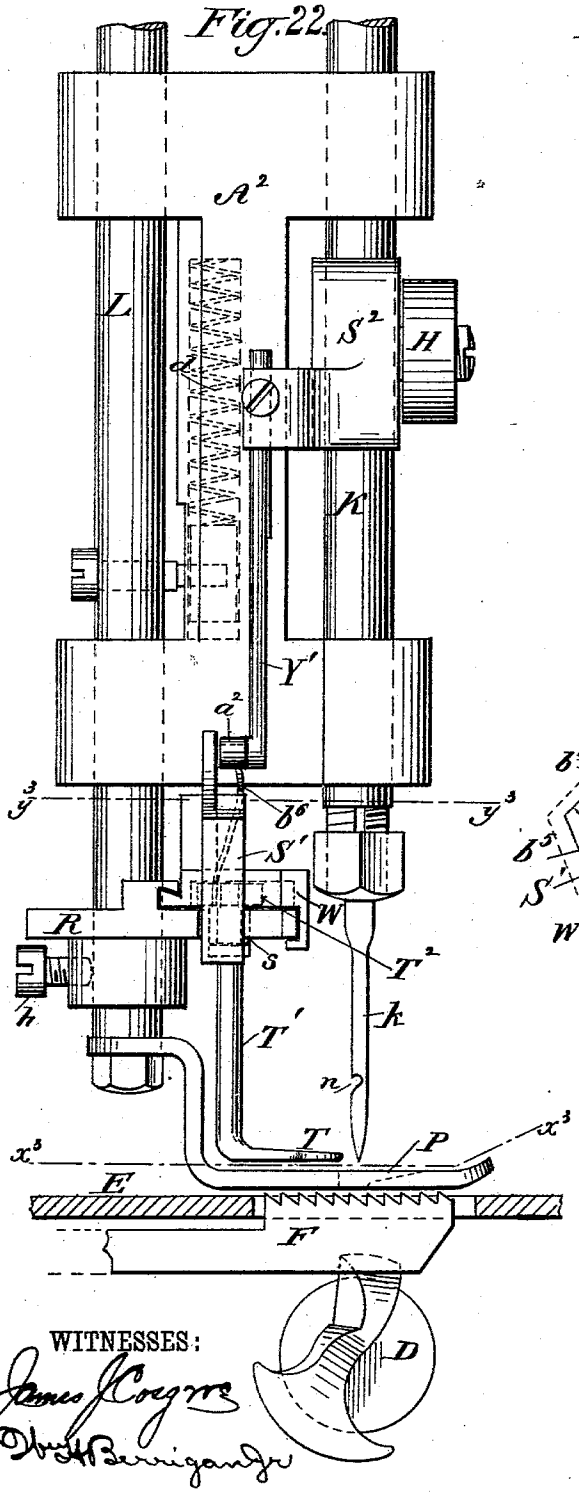
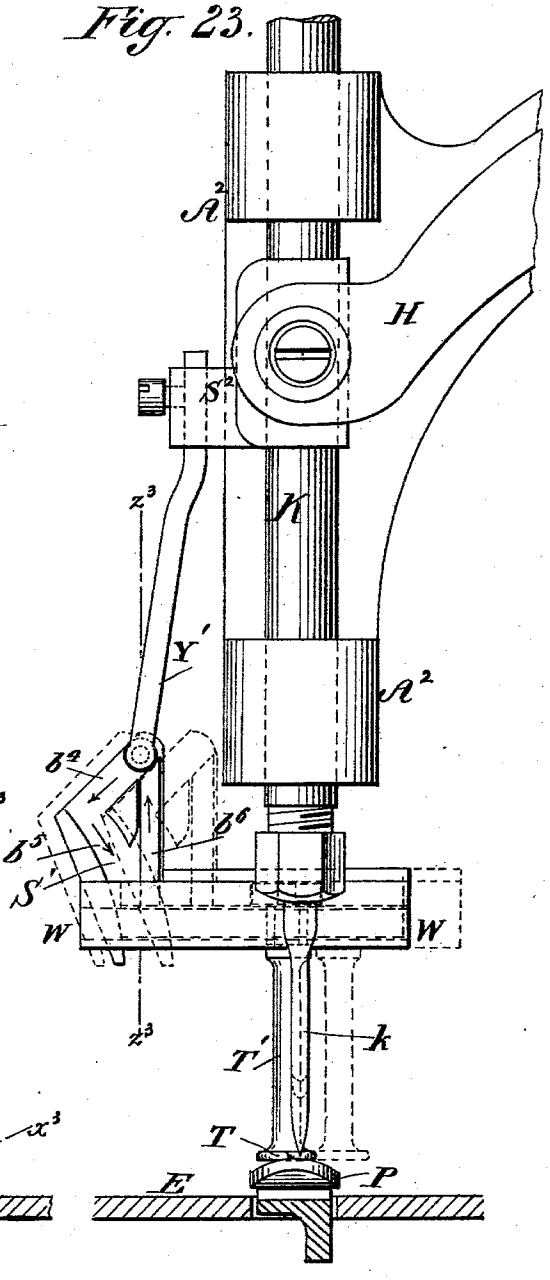


Fig. 23.



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(No Model.) 8 Sheets—Sheet 8.

A. LEGG & C. W. WESTON.

SEWING MACHINE.

No. 474,840. Patented May 17, 1892.

Fig. 24

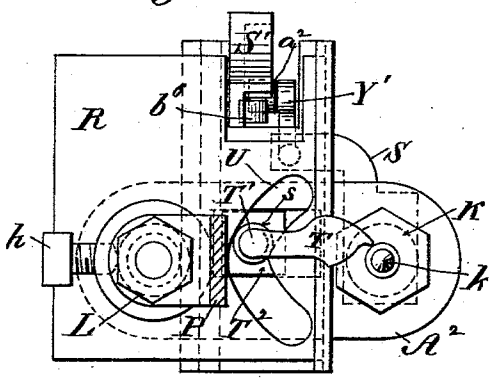


Fig. 25.

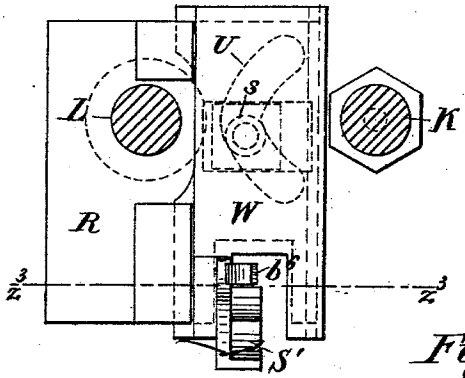


Fig. 26.

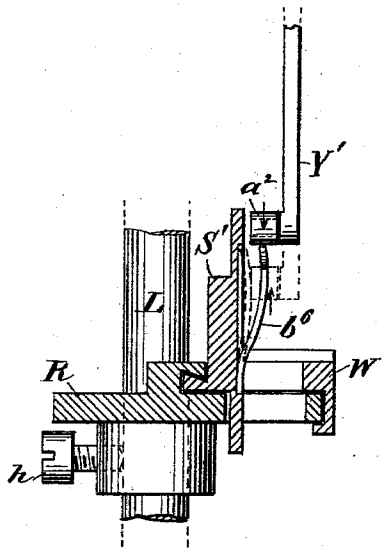


Fig. 27.

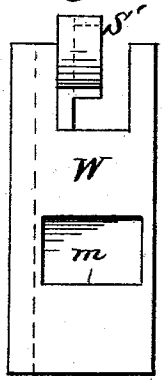
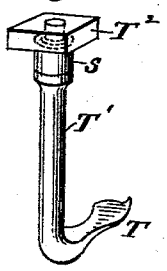


Fig. 28.



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UNITED STATES PATENT OFFICE.

ALBERT LEGG AND CHARLES W. WESTON, OF MILTON, NEW YORK.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 474,840, dated May 17, 1892.

Application filed March 18, 1890. Serial No. 344,301. (No model.)

To all whom it may concern:

Be it known that we, ALBERT LEGG and CHARLES W. WESTON, both citizens of the United States, residing at Milton, in the county of Ulster and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

Our invention relates to any form of sewing-machine to which the usual eye-needle is applicable; and the object of our invention is to do away with the labor and annoyance attendant upon threading the needle by hand and to avoid the wear of the thread by its being drawn forward and backward through the eye of the needle, as is the case with the ordinary sewing-machine needle.

Our invention consists of the devices for threading and unthreading a reciprocating needle having a recess or open eye at each stitch, hereinafter described, and set forth in the claims.

We will now proceed to describe one form of our invention, recognizing, however, that the same may be modified in various details without departing from the spirit of our invention.

Having reference to the accompanying drawings, in which similar letters and numerals of reference indicate corresponding parts, Figure 1 is a side elevation showing a form of machine to which our invention is applicable. Fig. 2 is an enlarged end elevation of Fig. 1, partly in section, on the line *x x*, Fig. 3. Fig. 3 is an enlarged side elevation of Fig. 1, partly in section, on the line *y y*, Fig. 2, of a portion of the machine. Fig. 4 is a detail sectional view on the line *z z*, Fig. 3. Fig. 5 is a sectional end elevation, further enlarged, taken on the line $x' x'$, Fig. 6. Fig. 6 is a sectional side elevation, similarly enlarged, taken on the line $y' y'$, Fig. 5. Fig. 7 is an inverted plan view of Figs. 5 and 6, all parts below the line $z' z'$ being removed. Fig. 8 is an inverted plan view of the slide for the finger or thread-carrier, shown separately. Fig. 9 is a perspective view showing the thread-carrier. Figs. 10 and 11 are detail views taken in horizontal and vertical sections, respectively, on the lines $x^2 x^2$ and $x' x'$ of Fig. 6. Figs. 12, 13, 14, 15, 16, 17, and 18 similar views showing the successive positions of the corresponding parts. Fig. 19 is a detail view showing the parts in section on the line $y^2 y^2$, Fig. 2, looking from the front of the machine toward the rear, the position of the parts corresponding to that shown in Figs. 17 and 18. Fig. 20 is an enlarged detail view of the lower portion of the needle, looking in the same direction as in Figs. 2 and 5. Fig. 21 is a like view looking in the same direction as in Fig. 6. Figs. 22, 23, 24, 25, 26, 27, and 28 show one modification of the means which may be used for operating the finger or thread-carrier without departing from the spirit of our invention.

In the general views, Figs. 1, 2, and 3, representing a single-thread chain-stitch machine, A A' A^2 is the supporting-frame for the various parts; B, the driving-belt wheel on the shaft C; D, the rotary hook carried on said shaft, and E the cloth-plate. F is the feed-surface; G, the feed-bar, guided at *a* and operated by the eccentric *b* on the shaft C. H is the lever-arm, operated in the manner in common use in such machines by an eccentric on the shaft C, located at I, through the connecting-rod J. K is the needle-bar, to which said arm is pivoted at *c*. L is the foot-bar, and P the presser-foot, retained on the cloth by the spring *d* when the lifter *e* is released. The thread is supplied from M, fed through the tension-disks N, the eye *f*, and the take-up *g* in the usual manner.

We will now describe the novel parts of the mechanism and the working thereof, referring to all of the figures, with the explanation that in Figs. 22 to 28 the location and form of the mechanism for operating the finger or thread-carrier are slightly altered.

R is a horizontal plate secured to the foot-bar L by a set-screw *h*, and R' is a vertical extension thereof, the same bearing the thread-distending mechanism and supporting it in given relation to the presser-foot P.

S is a three-way cam rigidly attached to the needle-bar K, which cam operates the parts borne on the plate R R'.

V is a thread-guide, which may be an eye, hook, or any contrivance adapted to form a point from which the thread may be taken by the finger and distended across the path of the needle, fixed rigidly with reference to the plate R and the presser-foot, and T is the fin-

ger or thread-carrier for seizing the thread and distending it from said guide transversely to the path of the needle *k* at the proper time, and is adapted after it has distended the thread, as aforesaid, to return to its former position, having left behind the portion of thread thus distended and ready to seize and distend another portion.

n is a notch or depression in the side of the needle, and an incline *n'*, Fig. 20, in the direction of said point, forming a spur *o*, Fig. 20, disposed toward the point of the needle.

p, Figs. 20 and 21, is a longitudinal groove in the side of the needle for receiving one side of the bight of the thread when it is passed through the cloth, such groove being common in eye-needles.

The finger T describes a horizontal path partially around the needle, (indicated by the line x^3 x^3, Figs. 10, 12, 13, 15, and 17,) its course being governed by the cam-slot U, Figs. 5, 6, and 7, in the plate R. The shank T of the finger is projected rigidly from a guiding block or head T^2, and this block is movable transversely to the machine in the ways *m* of the slide W. The slide W is movable endwise relative to the machine, and the combined sliding movements of said block and said slide permit the shank T', projecting through the slot U, to follow the curvature or cam-surfaces of said slot, guiding the finger T accordingly. The shank T' is provided with an anti-friction roller *s* at that portion bearing in the slot U. The slide W is guided by the ways *r* on the plate R and is reciprocated at every stroke of the needle by means of the aforesaid three-way cam S through the lever Y, fulcrumed at *t* in the lugs *u u'* of the plate R'. The lever Y is capable of motion in two directions—that about its axis *t* and that in the length of said axis. To this purpose the axial shaft *t* is movable endwise in its lugs or bearings *u*, and a spring *w*, compressed between the lug *u* and a pin *v* in the shaft, tends to keep the upper extremity of the lever against the cam S. The upper extremity of the lever Y bears a horizontal pin and anti-friction roller *a'* thereon, which engages with the slot *b'*, traveling therein in the direction indicated by arrows in Fig. 6 when the needle-bar reciprocates. The portion b^3 of the slot is inclined, as shown in Fig. 4, forming a shoulder or ridge at b^2, whereby the roller *a'*, being always pressed toward the cam by the spring *w*, is prevented from returning through the vertical portion of the slot when the needle-bar descends. The lower end of the lever Y being swiveled in the transverse slot *c'* of the slide W is free to perform the motions described, imparting to the thread-carrier T an advance and return movement from the position shown in Fig. 10 to that in Fig. 13 and again that of Fig. 10, while the needle performs its descending stroke, the finger being kept in its normal position, Fig. 10, while the needle performs its ascending stroke.

Referring now more particularly to Figs. 10 to 21, inclusive, the operation of our invention is as follows: The mode of operation of all the well-known parts in making the chain-stitch is substantially similar to that usual in co-operation with an eye-needle, the needle first descending with a bight of the thread, then rising, whereby a loop is formed, Figs. 18 and 19, the point *d'* of the rotary hook D then entering the loop, then drawing the stitch, Fig. 11, and then reversing the threads 1 2 of the loop by the heel d^2 of the hook D to twist the stitch, Fig. 14, the needle again descending and the point *d'* of the hook taking another loop, while the first loop is cast off from the tail d^3 of the hook and the under stitch drawn by the take-up *g* of the needle-bar. Corresponding with these operations and commencing with Fig. 10 the portion 3 of the thread between the guide V and the preceding stitch under the presser-foot is seized by the point of the finger T while the needle is descending. Before the spur *o* of the needle reaches the level of the path of the finger T the latter completes its advance stroke x^3 x^3 partially around the vertical path of the needle, distending the said portion 3 of the thread in a line transverse to the vertical path of the needle, so that the thread enters the notch *n* and is caught by the spur *o* as it passes. This period of motion is shown in Figs. 13 and 14. A bight of the thread thus seized is then passed through the cloth, and thereupon the finger T returns, releasing the loop 4, formed by its advance motion. This completes the work of the finger T, and as the needle rises and the hook enters the loop 5 the loop 4 is drawn down, bringing the stitch flush with the upper face of the cloth. The loop 6 is then drawn in the usual manner by the take-up *g* and cast off the tail d^3 of the hook. The groove *p* of the needle serves the same function in conjunction with the notch *o* as in the case of the ordinary eye-needle, the lower surface *n'* of the notch lifting the loop 5, the portion of the thread lying in the groove *p* passing up freely with the needle through the cloth as the take-up *g* rises.

In Figs. 22 to 23 is shown another means for operating the finger or thread-carrier and which may be briefly described as follows: In this modification the slide W is guided by a groove in plate R and grooved flange on said slide and is reciprocated at every stroke of the needle by means of the three-way cam S', which, however, in this case is not attached to the needle-bar, but is rigidly attached to the slide W, and the slide motion of the slide W is given to it by the rod Y', (shown in the drawings as bent, but which may be straight and perpendicular by having the lug forming part of the sleeve S^2 fastened to the needle-bar to project farther than shown in the drawings,) fastened at its upper end in a lug forming part of the sleeve S^3, secured to the needle-bar and operated by the same and having upon its lower extremity the roller a^2, which

travels in the direction of the arrows in the three ways b^4, b^5, and c^6, Fig. 23, of the said cam S′, as may be readily understood from an examination of the drawings.

Various actuating mechanisms other than those herein shown and described may be employed to similarly actuate the finger or thread-carrier, and we do not therefore confine ourselves to the said specific mechanism. Such actuating mechanism, moreover, may be modified for special adaptation of the invention to other types of sewing-machines. So, also, modified shapes may be adopted for the spur of the needle without departing from the spirit of our invention.

Therefore, having fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a sewing-machine, the combination of a needle having a recess or open eye and means for reciprocating the same, with means for threading said needle upon each downward stroke thereof, consisting of a guide at one side of the path of said needle and a thread-carrier moving in an angular path across the path of said needle and means for operating the same, and complemental stitch-forming mechanism, substantially as and for the purposes described.

2. In a sewing-machine, the combination of a vertically-reciprocating needle having a spur, a thread-carrier for distending the thread horizontally in the path of the needle above the cloth in the line of descent of the spur, and actuating mechanism for said carrier, consisting of a horizontal plate upon the presser-foot bar bearing an angular slot, through which the shank of the carrier projects, a transversely-movable slide bearing the carrier, and a longitudinally-moving slide bearing the transversely-moving slide, whereby the said shank is moved through the path of the longitudinally-moving slide, substantially as shown and described.

3. In a sewing-machine, the combination, with the needle-bar, the needle having a spur on its side, the thread-carrier, the angularly-slotted plate, and the slides for moving the carrier in the path of the slot, of the three-way cam attached to the needle-bar, and the lever engaging at its upper end with the said cam and at its lower end with the slide, moving endwise relative to the machine, substantially as described.

4. In a sewing-machine, the combination, with the needle-bar, the needle having a spur on its side, the thread-carrier, the angularly-slotted plate, and the slides for moving the carrier in the path of the slot, of the three-way cam and the lever connected, substantially as described, movable about its fulcrum and also in the line of the axis of its fulcrum in response to the direction given by the inclined portion of the slot of the cam, said cam having a vertical slide engaging the lever when the needle ascends, and the angular slot engaging the lever when the needle descends, adapted to move the thread-carrier through an advance and return stroke transversely to the path of the needle, for the purpose set forth.

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