

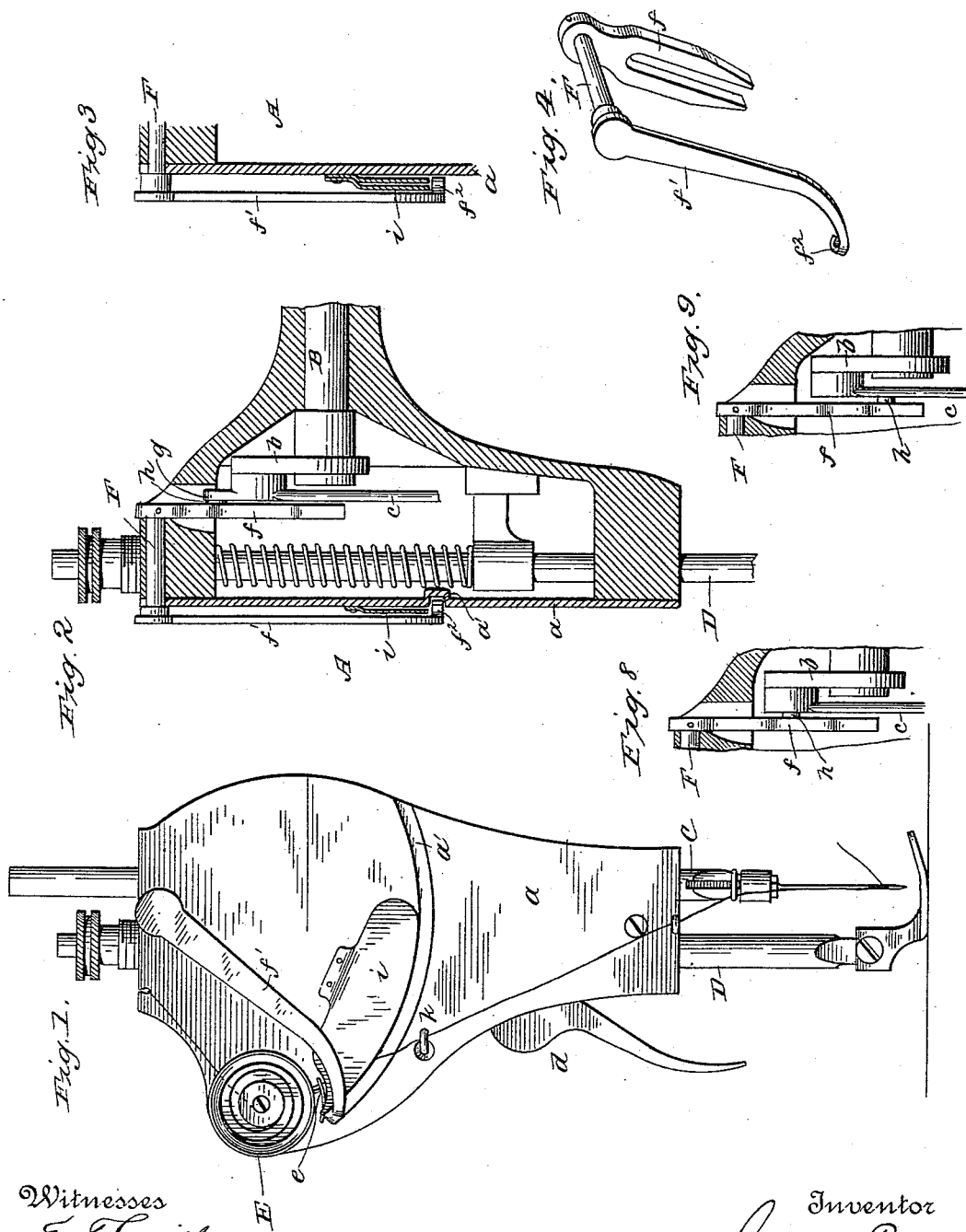
(No Model.)

2 Sheets—Sheet 1.

J. BOLTON.
TAKE-UP FOR SEWING MACHINES.

No. 420,034.

Patented Jan. 28, 1890.



Witnesses
E. J. Smith
A. W. Harrison

Inventor
James Bolton
By his Attorney
Kearney & Co.

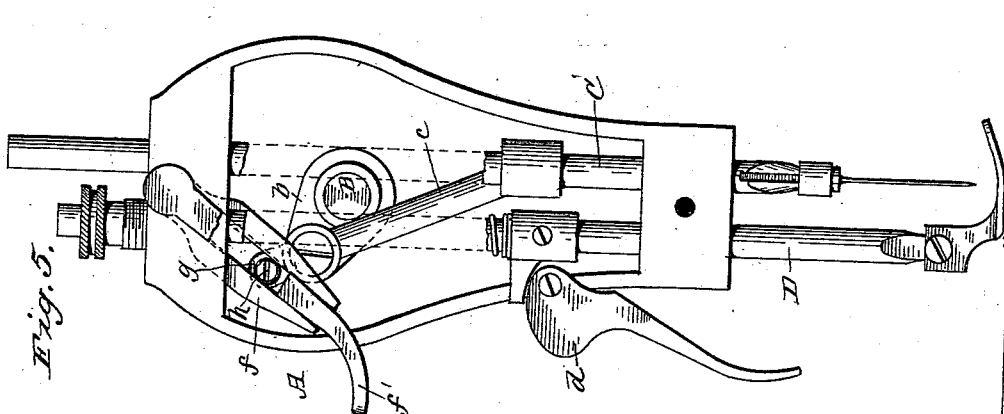
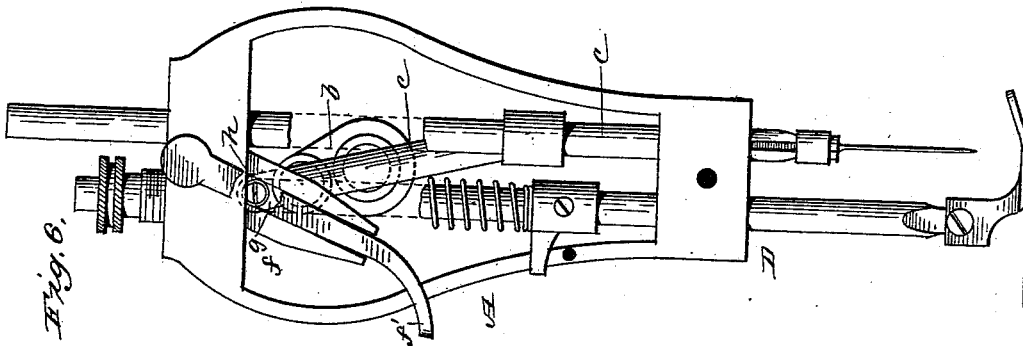
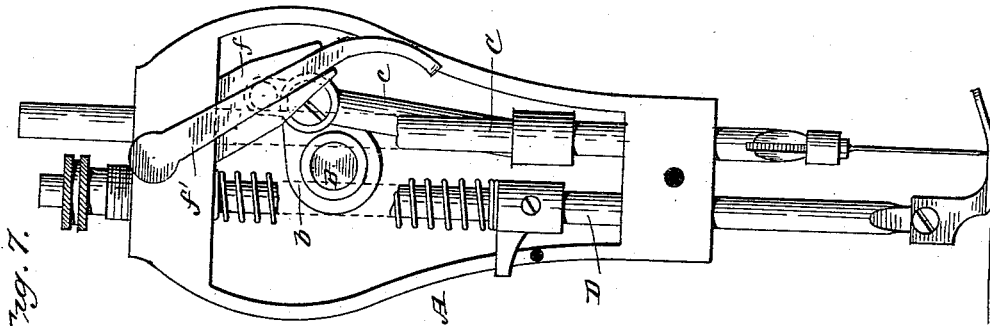
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A. W. Harrison

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UNITED STATES PATENT OFFICE.

JAMES BOLTON, OF CHICAGO, ILLINOIS.

TAKE-UP FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 420,034, dated January 28, 1890.

Application filed April 27, 1889. Serial No. 308,824. (No model.)

To all whom it may concern:

Be it known that I, JAMES BOLTON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Take-Ups for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

In the operation of high-speed lock-stitch sewing-machines employing cam-operated take-ups the wear of the cams or the cam-slotted arms is so great that these parts require frequent renewals, the wear being equal and greatest at the points of sharpest curves in the cams or cam-slotted arms.

The object of my invention is to obviate this difficulty by providing a take-up mechanism more especially adapted for high-speed machines in which the take-up is operated by a rotating crank-pin working in a straight slot in a take-up-operating arm, the arrangement of the parts being such that a perfect timing of the take-up is secured without the assistance of an auxiliary take-up.

In the drawings, Figure 1 is a front view of the head of a sewing-machine with my improved take-up applied thereto. Fig. 2 is a sectional view of the same. Fig. 3 is a detail view illustrating a slightly-different form of thread-retainer from that shown in Fig. 2. Fig. 4 is a detail perspective view of the take-up rock-shaft and its operating and take-up arms. Figs. 5, 6, and 7 are front views of the head, with the face-plate removed, showing the take-up and needle-bar in different positions. Figs. 8 and 9 are detail views illustrating modified arrangements of the crank-pin or stud for operating the take-up.

In the drawings, the head A, rotating main shaft B, its crank *b*, needle-bar C, pitman *c*, connecting said crank and needle-bar, the presser-bar D, lifter *d*, tension E, and check-spring *e* are or may be of ordinary construction.

F is the take-up rock-shaft journaled in the upper part of the head above the main shaft B, and preferably central over said shaft B, said rock-shaft F being provided with a slotted operating-arm *f* and a take-up arm *f'*, both of which extend in the same direction from said shaft and preferably di-

rectly in line with each other, or approximately so.

The needle-bar pitman *c* is provided with an extension *g*, carrying a roller-stud *h*, working in the slot of the arm *f*, said slot being straight, as shown. The take-up arm *f'* is provided in the present instance with an open hook *f''*, working beneath a thread-retainer consisting, preferably, of one or two rigid plates having curved lower edges corresponding to the arc in which the take-up hook swings. If but a single plate *i* be employed, as shown in Fig. 2, the face-plate *a* will be provided with a groove *a'* for the reception of the end of the take-up hook, while if two plates *i* be employed, as shown in Fig. 3, the face-plate will be plain, the inner end of the take-up hook extending inside of the outer surface of the inner plate *i*.

The single-thread-retaining plate *i*, Fig. 2, is separated from the face-plate a distance about equal to the diameter of a thread, and the plates *i*, Fig. 3, are separated from each other this same distance, forming in each instance a thread-retaining space. When the thread is drawn taut it can move freely in the thread-retaining space with little or no friction; but when entirely relieved from strain its twist will kink or slightly expand it, so that the rigid plate or plates will exert a slight friction on it sufficient to hold it where it may be left by the take-up and until positively drawn down by the needle or shuttle.

The operation of my invention is as follows: The needle having descended through the work and thrown out its loop, the latter is seized and expanded by the shuttle, which passes into it in the usual manner, and during these operations the take-up arm or lever *f'* (or take-up proper) has swung from the position shown in Fig. 7 to the position shown in Figs. 1 and 5. In Fig. 1 it will be observed that the take-up hook is some little distance beyond or to the left of the thread running from the tension device to the thread-guide eye *k* on the face of the plate *a*, and that the needle has risen above the work. As the needle continues to ascend, the shuttle continues its passage through the loop of needle-thread, and by the time it is far enough through to permit the operation of

tightening the stitch to commence the take-up has moved from the position shown in Figs. 1 and 5 to the position shown in Fig. 6, and its hook then engages the bight of thread between the tension device and the guide-eye *k*, and the operation of tightening the stitch commences. The roller-stud *h* is now at or near the upper end of the slot in the arm *f* of the take-up rock-shaft, and, being thus near to said shaft, is in position to give a rapid movement to the take-up, so that during about or slightly less than a quarter-revolution of the shaft B the take-up moves from the position shown in Fig. 6 to the position in Fig. 7, thus quickly effecting the take-up operation and tightening the stitch. When the parts have reached the position shown in Fig. 7, the needle has begun its descent for the next stitch, and as it continues its downward movement the thread is slackened, and it immediately kinks or enlarges sufficiently to be held by the rigid thread-retainer afforded by the plate or plates *i*, beneath or between the forward part or parts of which it was drawn by the take-up as the latter swung forward. Thus as the needle descends the thread is held from sagging in the way of the point thereof, but is free to be drawn down as wanted by the shuttle as the loop for the stitch about to be made is expanded. When the take-up approaches the position shown by Fig. 7, at which position the final pull on the thread to tighten the stitch is given, the stud *h* has traveled down the slotted operating-arm *f* a little distance, so that it is not so near the rock-shaft F as it was during the earlier part of the take-up movement, when there was but little strain on the thread, and as the said stud is also traveling approximately in the direction of the slot of the arm *f* when this final pull is given the purchase is great and the movement of the take-up arm is slow at the moment when the greatest strain comes. After the stitch is tightened the stud *h* continues its downward movement in the slot of the arm *f*, allowing the take-up to pause for an instant and then swing back comparatively slowly, the stud *h* in the backward movement of the take-up being at or near the outer end of the operating-arm *f*, and thus at its greatest distance from the center of movement of the take-up arm. When near the end of its backward movement and when the operating end of the take-up arm is beyond the line of thread running from the tension device to the guide-eye *k*, said take-up arm is also moving very slowly, so that in the lost-motion position beyond said thread-line considerable time is gained to enable the shuttle to pass the needle-loop and thus secure a proper timing of the take-up. By extending the two arms of the take-up rock-shaft in the same direction from said shaft, so that they are in line or approximately so, I am enabled to get a perfectly-timed take-up actuated from the rotating stud or crank-pin working

in a straight slot in the operating-arm of said rock-shaft without the use of a cam or a cam-slotted arm. I thus produce a properly-timed take-up adapted for co-operation with oscillating or rotating shuttles requiring large loops of needle-thread as well as with other shuttles, and which take-up does not require the assistance, to get the proper timing, of an auxiliary take-up or thread-controller such as is required by the take-up shown by United States Patent No. 345,683, or a cam-slotted arm such as is employed in the take-up shown by United States Patent No. 399,949, in which latter device the assistance of an auxiliary take-up is also necessary.

The rigid thread-retainer in the two forms shown in Figs. 2 and 3 consists in both instances of two rigid plates slightly separated from each other. In the form shown in Fig. 2 these two rigid separated plates consist of the plate *i* and the face-plate *a*, and in the form shown in Fig. 3 the rigid thread-retainer consists of the two separated plates *i*. These plates *i*, being of thin metal, are of course only relatively, not absolutely, rigid, the term "rigid" as herein used being understood to mean a plate not pressing on the thread by spring-pressure, as I rely on the elasticity of the thread, which kinks or expands when strain thereon is relaxed, to adapt it to be lightly held by the rigid thread-retainer. It will, however, be understood that any suitable or well-known form of spring thread-retainer may be employed in connection with my improved take-up, consisting of a rock-shaft with a straight slotted operating-arm and a take-up arm, both extending in the same direction, instead of the rigid thread-retainer herein described, if desired, and in using my improved take-up constructed as just referred to, or with the two arms of the take-up rock-shaft extending in the same direction, with any forms of shuttles, excepting oscillating or rotating shuttles having long beaks, the thread-retainer may be dispensed with altogether.

It will be observed from the foregoing description that as the take-up arm or lever *f'* moves backward or to the left of the line of the thread running from the tension device (which is in one sense a thread-guide or thread-guiding device) to the guide-eye *k* sufficient lost motion to secure the proper timing in taking up large loops, such as are required for oscillating or rotating shuttles, is afforded, and with this lost motion an open thread-hook *f*² or a long slotted eye is necessary. This feature of arranging the parts so that the take-up arm swings backward beyond the thread-line between two thread-guides on the face-plate I regard as important, as it enables my take-up to be used with a greater variety of shuttles than it otherwise could be, and thus gives it a wide range of usefulness; but in using my improved take-up on a machine having a cylindrical or other shuttle not requiring such large loops the throw of the take-

up arm need not be so great, and need not therefore, have this lost motion, and in such cases the operating crank-pin or stud may be coincident with the needle-bar-pitman crank-pin, or may even be on the pitman below its operating crank-pin, instead of being on an extension above the pitman crank-pin, as in the present case. Such modified arrangements of the crank-pin or stud for operating the take-up are shown in the detail views, Figs. 8 and 9.

I claim—

1. In a sewing-machine, the combination, with the head and a rotating stud or crank-pin within the latter, of a take-up rock-shaft journaled at the upper part of said head and having an operating-arm provided with a straight slot receiving said stud or crank-pin and with a take-up arm, said arms both extending in the same direction from said rock-shaft and being thus in line with each other, or approximately so.

2. In a sewing-machine, the combination, with the head, the main shaft, and the needle-bar connected with the latter, of a take-up rock-shaft journaled in said head centrally over said main shaft and provided with an operating-arm having a straight slot, and with a take-up arm, and a rotating crank-pin or stud working in the said straight slot to operate said rock-shaft.

3. In a sewing-machine, the combination, with the head, and a vibratory take-up arm having a hook or projection to engage the thread when moving in one direction only, of a thread-retainer arranged adjacent to the path of the said take-up hook or projection and consisting of two rigid and slightly-separated plates.

4. In a sewing-machine, the combination, with the head A, of the main shaft B, its crank *b*, the needle-bar C, the pitman *c*, hav-

ing the extension *g*, provided with the crank-pin or stud *h*, and the take-up rock-shaft F, journaled above said shaft B and having operating-arm *f*, provided with a straight slot receiving said crank-pin or stud *h*, and having also the take-up arm *f'*, said operating and take-up arms both extending in the same direction from said shaft.

5. In a sewing-machine, the combination, with the head A, of the main shaft B, its crank *b*, the needle-bar C, the pitman *c*, having the extension *g*, provided with the crank-pin or stud *h*, the take-up rock-shaft F, journaled above said shaft B and having operating-arm *f*, provided with a straight slot receiving said crank-pin or stud *h*, and having also the take-up arm *f'*, said operating and take-up arms both extending in the same direction from said shaft, and the thread-retainer adjacent to the path of movement of the free end of the take-up arm and consisting of two rigid and slightly-separated plates.

6. In a sewing-machine, the combination, with the head and face-plate, the latter being provided with two thread-guides or thread-guiding devices, of a take-up rock-shaft journaled in the upper part of said head and provided with a take-up arm and an operating-arm having a straight slot, both of which arms extend in the same direction from said rock-shaft, and a rotating stud or crank-pin working in said slotted arm and serving to operate said take-up arm and swing the latter backward beyond the line of the thread running between said thread-guiding devices.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES BOLTON.

Witnesses:

HENRY CALVER.

EWELL A. DICK.