2 Sheets--Sheet 1.

C. H. CHAPMAN.

Loom for Weaving Suspender-Webbing.

No. 160,749. Patented March 16, 1875.

Fig. 9.

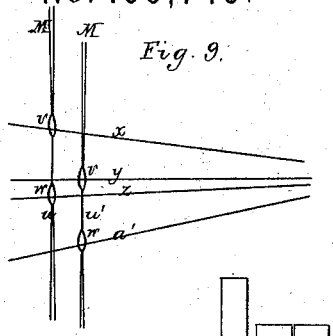


Fig. 1.

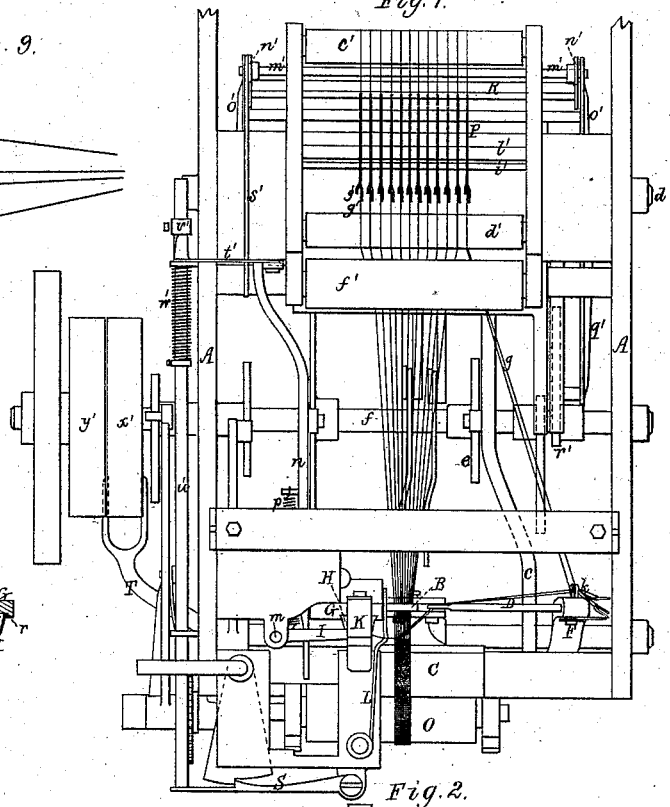


Fig. 6.

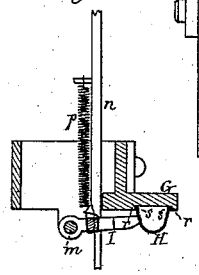


Fig. 2.

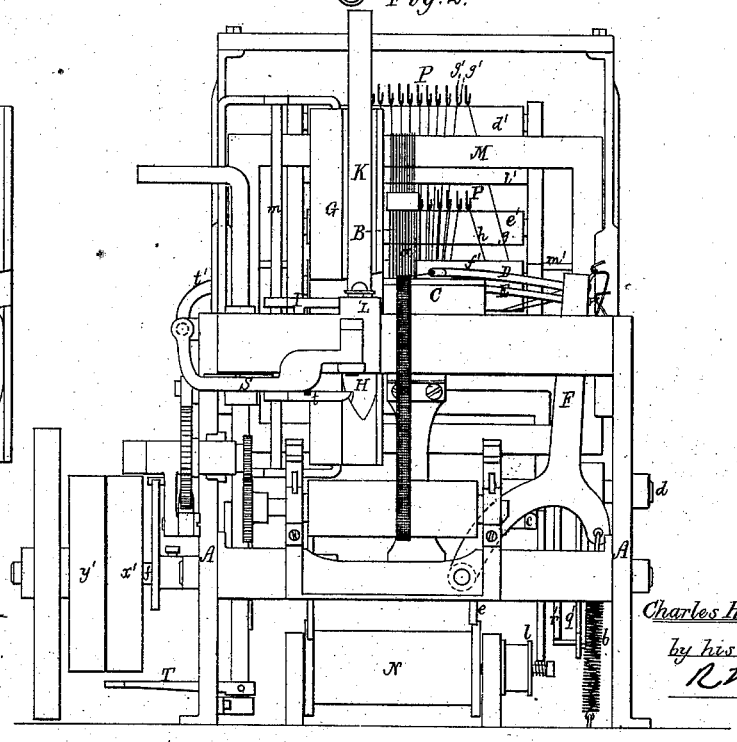


Fig. 5.

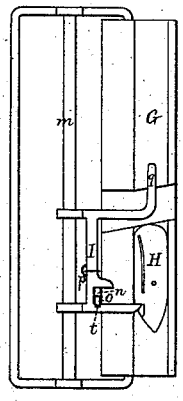
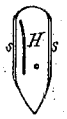


Fig. 8.

Fig. 7.



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2 Sheets--Sheet 2.

C. H. CHAPMAN.

Loom for Weaving Suspender-Webbing.

No. 160,749. Patented March 16, 1875.

Fig. 3.

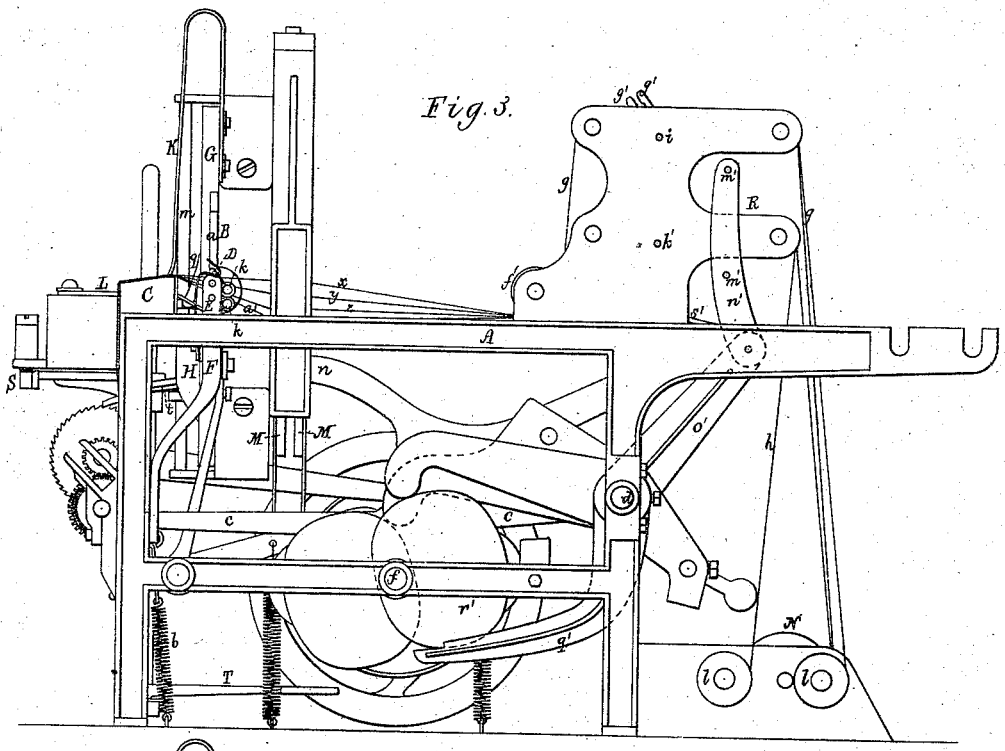
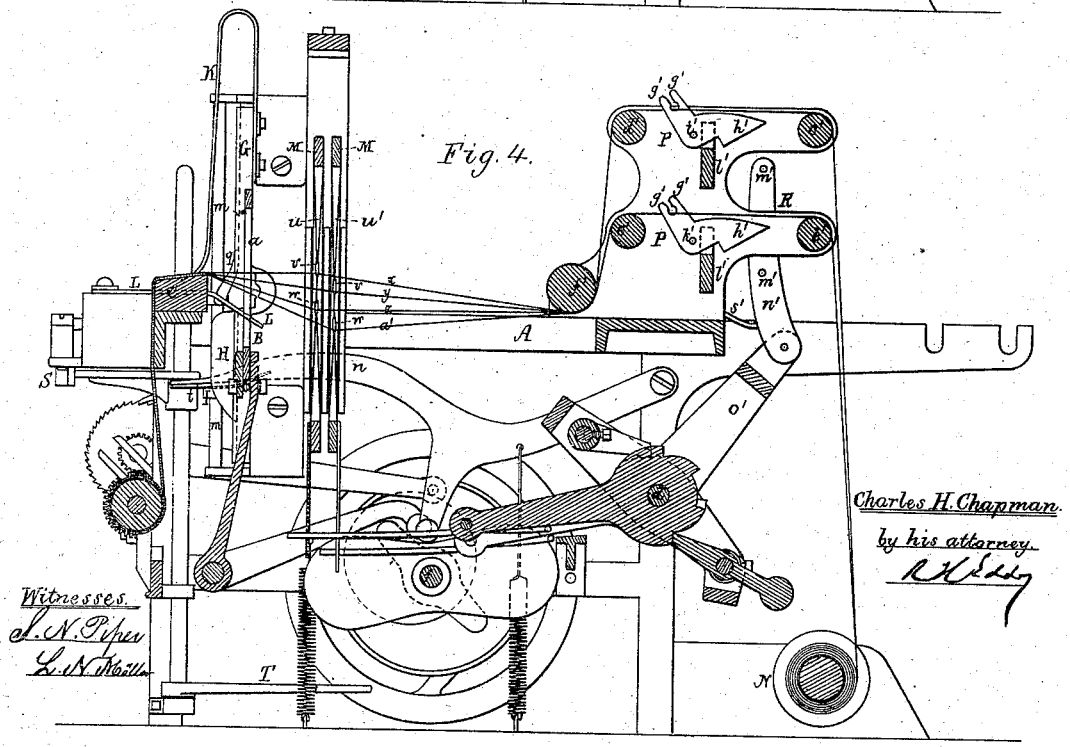


Fig. 4.



Witnesses.
S. N. Piper
L. N. Wells

Charles H. Chapman.
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UNITED STATES PATENT OFFICE.

CHARLES H. CHAPMAN, OF SHIRLEY, MASSACHUSETTS.

IMPROVEMENT IN LOOMS FOR WEAVING SUSPENDER-WEBBING.

Specification forming part of Letters Patent No. **160,749**, dated March 16, 1875; application filed January 20, 1875.

To all whom it may concern:

Be it known that I, CHARLES HENRY CHAPMAN, of Shirley, of the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Looms for Weaving Suspender or various other kinds of Webbing; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a front elevation, Fig. 3 a side elevation, and Fig. 4 a longitudinal and vertical section, of a loom with my improvement.

Such other figures as are necessary to the illustration of my invention are hereinafter referred to and explained.

The kind of loom on which my improvements are based is one provided with a needle to carry a filling-thread, and a shuttle to operate therewith, and lock said filling-thread at one selvage of the webbing by a thread borne by the said shuttle or a spool therein.

In carrying out my invention I add to the needle-carrier an auxiliary needle to bear an auxiliary filling-thread, and to operate with the shuttle and primary needle, the nature of my invention consisting mainly as follows: First, in the combination of the auxiliary needle with the main needle, the lay, and the shuttle, all being provided with mechanism for operating them, substantially as hereinafter described. Second, in the combination of a loom-harness, provided with two eyes to each heddle, with the main and auxiliary needles, the lay, and the shuttle, to operate as described. Third, in the combination of a shuttle-thread-guide, substantially as explained, with the needle or needles, the shuttle, and the lay, provided with mechanism for operating them, as set forth. Fourth, in the combination of a shuttle-presser, substantially as described, with the shuttle, its race, and carrier, arranged in manner and to operate as set forth. Fifth, in a stop-motion, substantially as hereinafter described, applied to the warps and filling-threads. Sixth, in the shuttle-carrier, as provided with a bearing-horn to support it by the race, and also with a spring to press or draw the carrier toward the shuttle. Seventh, in the shuttle-carrier actuating-lever, provided with a spring to extend from it into the notch in the carrier, such spring being for the purpose hereinafter specified.

In the drawings, A denotes the loom-frame, and B the lay, the latter being provided, as usual in looms, with a reed, *a*. C is the breast-beam, and D and E are the main and auxiliary needles, both of which project from one needle-arm, F, having mechanism, as usual, for imparting to it its necessary intermittent reciprocating movements. This needle-arm at its foot is pivoted to the frame A, and provided with a spring, *b*, to effect its retraction, its advance being produced by a lever, *c*, projecting into or under it, as shown. This lever *c* is pivoted at its rear upon a shaft, *d*, and has applied to it a cam, *e*, for moving it upward, such cam being fixed on the driving-shaft *f*. Each needle has an eye near its inner end, the filling-threads *g h*, which proceed from spools *l l*, arranged as shown, being led through these eyes, and also through guide-eyes *k k* projecting from the needle-arm. Arranged vertically and near the lay, as represented, is the shuttle-race G carrying the shuttle H, the latter being arranged to play in a vertical line, and to be moved up and down by a carrier or actuator, I, which slides upon a stationary vertical rod, *m*, arranged as shown. There is applied to such carrier I and its actuating-lever *n*, that extends through a notch, *o*, in the carrier, a spring, *p*, to draw the carrier toward the shuttle. There is also applied to the carrier a horn, *q*, extending from it up against the shuttle-race.

Fig. 5 is a front view of the shuttle, its race and carrier. Fig. 6 is a horizontal section of the same, showing the carrier-actuating lever *n* and the spring *p*. It also exhibits the race and shuttle as provided with dovetailed lips *r r s s* for holding the shuttle in connection with the race arranged vertically. Fig. 7 is a top view, and Fig. 8 an end view, of the shuttle.

By taking hold of the carrier I, and pulling it away from the race far enough, the shuttle may be easily extracted from, or applied to, the race as circumstances may require. The bearing-horn *q*, by resting against the race, enables the shuttle to play with sufficient

looseness in the carrier for the shuttle to pass through the loops of the threads of the needles.

There is applied to the lever *n* a spring, *t*, to extend from it in manner as shown, and to bear against the bottom of the notch *o* of the shuttle-carrier. The said spring accommodates itself and the lever to the wear of both the lever and the notch, and thus prevents noise that might result were the spring not used.

There projects from the shuttle-race and down in front of it, in manner as shown, a shuttle presser or holder, K, it being a spring, shaped and arranged as represented. Its object is to press against the shuttle, and hold it from dropping down in the carrier at the time the filling threads or loops may be passing the shuttle.

A wire, L, fastened to the frame A, near the inner end of the breast-beam, extends inward beyond the said breast-beam, and inclines downward in manner as shown in Fig. 4. This wire I term the "shuttle-thread guide," its purpose being to guide the shuttle-thread to, and hold it up to, the selvage while the needle may be in the act of being retracted, and the lay is beating up. Were the said guide dispensed with, the shuttle-thread would be liable to be loose, or to kink or knot at the selvage of the fabric.

Each of the harnesses M M has each of its heddles *u* or *u'* provided with two eyes, *v w*, instead of one only, as in ordinary harnesses, these eyes being disposed at short distances apart. The two harnesses are to operate with four sets, *x y z a*^{1}, of warp-threads, which, for the reception of the needles, make two "sheds," and all proceed, from one yarn-roller, N, to and over the breast-beam to the cloth-roller *o*.

In applying the four sets or two pairs of warps to the two harnesses, each heddle of each harness is to receive a warp-thread from each of the two pairs, all as shown in Fig. 9, in which *x y z a*^{1} exhibit the four sets of warps, *u u'* being the next adjacent heddles of the two harnesses. The threads of the upper sets *x z* run through the eyes *v w* of the heddles of one harness, the threads of the other sets *y a*^{1} being run through the eyes *v w* of the heddles of the other harness. By thus making each heddle with two eyes, *v w*, but two harnesses become necessary for the four sets of warps; whereas, with but one eye to a heddle, four harnesses would be required. My improvement in the harness thus enables me to dispense with two harnesses and the machinery to operate them, as would be required in case of there being but one eye to each heddle. Each harness, as in other looms, is to be provided with the usual mechanism for operating it.

The several warp-threads, on their passage from the warp-roller to and through the reed, pass across guide-rollers *b'*, *c'*, *d'*, *e'*, and *f'*, arranged as represented, each thread being led between the prongs *g' g'* of one of two series, P P, of angular levers *h'*, there being one of said levers to each warp-thread, and also one to each filling-thread. The levers of each set are pivoted on one of two rods, *i' k'*, arranged as shown, the tails or lower arms of the levers being disposed in slots made down in a guide and stop-bar or shoulder-bar, *l'*. With these levers a reciprocating vibrator, R, is used. It consists in part of two rods, *m' m'*, extended horizontally from and between two arms, *n' n'*, arranged as shown, and pivoted to a frame, *o'*, that turns on the shaft *d*, and has an arm, *q'*, extended from it, and projecting under and against one of the harness-cams, such cam being shown at *r'*. The weight of the vibrator suffices to keep its arm up to the cam. The cam while in revolution imparts to the vibrator up and down motions. An arm, *s'*, extends from one of the arms *n' n'* to and under a latch, *t'*, arranged as shown in Fig. 1. This latch when down serves, with a shoulder, *v'*, on a slide-rod, *w'*, to hold the rod back or from being pressed forward by a spring, *w'*, applied to it. The said slide-rod, arranged as shown, rests at its front end against the latch S of a shipper, T, that serves to shift the driving-belt from a fast pulley, *x'*, to a loose pulley, *y'*, on the driving-shaft of the machine.

The warp-threads while being drawn forward operate, by their friction against the prongs of the sets of levers P P, to draw the said levers forward in a manner to raise up their tails.

Should a warp-thread break, the lever *h'*, through which it may pass, will forthwith fall back and down to the bottom of the slit in the shoulder-bar, the weight of the tail of the lever causing such fall to take place. The lever then becomes a cam to move the vibrator R (during its next advance movement) in a manner to cause its arm *s'* to force the latch *t'* out of engagement with the slide-rod *w'*. As soon as this latter may take place, the spring *w'* will shoot forward the slide-rod and unlatch the shipper, so as to enable it to be moved to shift the belt from the fast to the loose pulley, and thereby cause a stoppage of the loom.

In the operation of this loom the two needles are moved forward through the two sheds of the warps, after which the shuttle descends, and goes through both loops of the threads of the needles. Next the needles are drawn back out of the warps, and the shuttle rises up, after which the lay beats up and drives both filling-threads up into their warps. Next the harnesses change, such harnesses, needles, shuttle, and lay being provided with the usual mechanisms for so operating them.

In making suspender or other webbing it is customary to use with the warps, as described, what are termed binding-warps, to be operated by other harnesses; but as these constitute no part of my invention, no further mention of them becomes herein necessary.

The drawings show much of the mechanism for operating the harnesses; but as this also is no part of my invention, but such as is in common use in other looms of the kind, it is not necessary to describe it.

By having the extra needle combined with the main needle and its carrier and the shuttle, I am enabled to accomplish double the work in the same time that I can with a single needle, and thus I accomplish a very important result.

I claim as my invention in the described loom as follows, viz:

1. The combination of the auxiliary needle E with the main needle D, the lay B, and the shuttle H, all being provided with mechanism for operating them, substantially as described.

2. The combination of the harnesses M, formed with two eyes in each heddle, with the main and auxiliary needles D E, the lay B, and the shuttle H, to operate as set forth.

3. The combination of the shuttle-thread guide L with the needle or needles, the shuttle, and the lay, provided with mechanism for operating them, as set forth.

4. The combination of the shuttle-presser K with the shuttle H and its race G and carrier I, arranged and to operate as described.

5. The stop motion, substantially as described, composed of the series of furcated levers h', the shoulder-bar l', the reciprocating vibrator R, its operative arm s', the latch t', the slide-rod u', shoulder v', the spring w', and the shipper-latch S, all arranged to operate substantially as specified.

6. The shuttle-carrier I, provided with the bearing-horn q, and with the spring p, to draw the carrier toward the shuttle.

7. The shuttle-carrier actuating-lever n, provided with the spring t, to extend from it, as shown, into the notch o in the shuttle-carrier I, for the reception of said lever.

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Witnesses:
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J. R. SNOW.