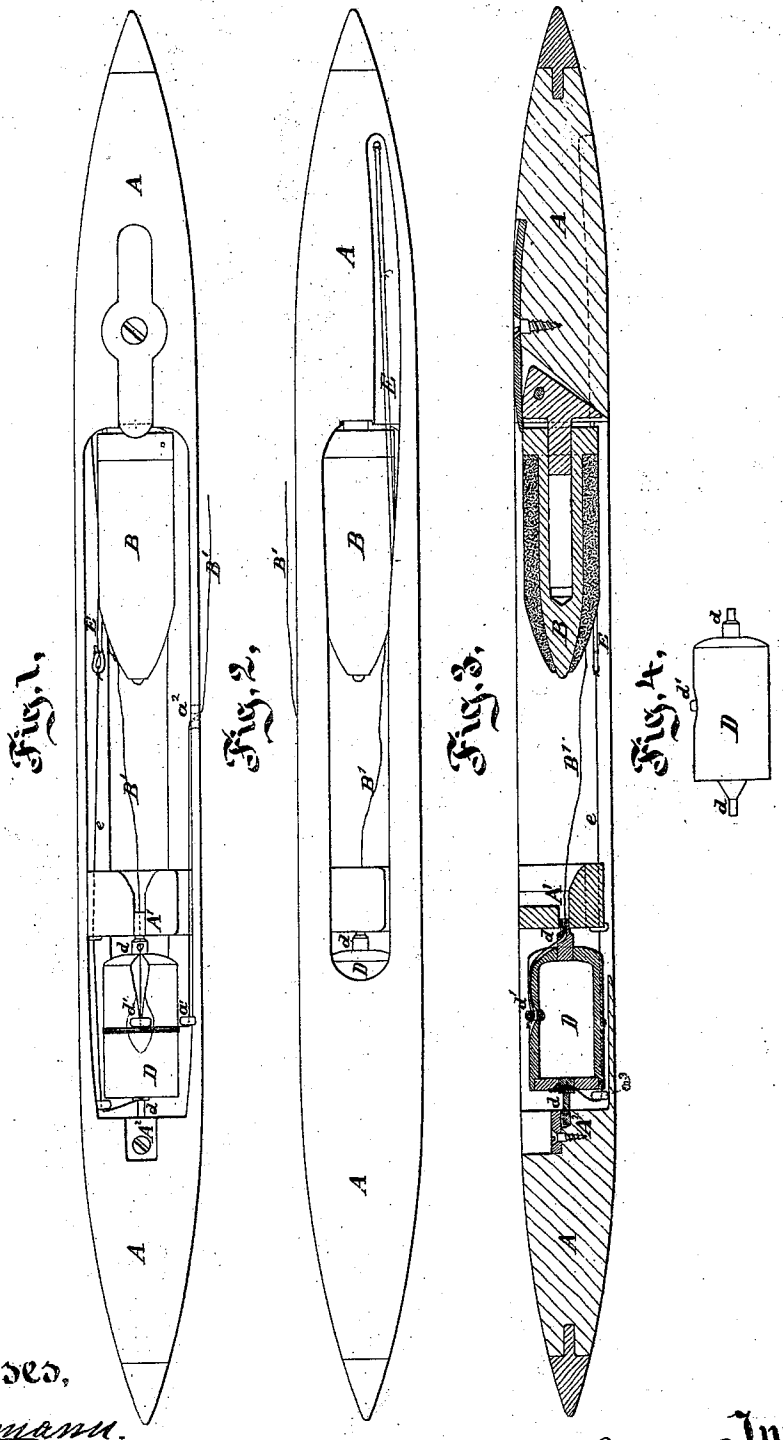
H. Carstaedt,

Loom Shuttle.

No. 107,220. Patented Sept. 13, 1870.



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HUGO CARSTAEDT, OF NEW YORK, N. Y.

Letters Patent No. 107,220, *dated September* 13, 1870.

IMPROVEMENT IN SHUTTLE FOR LOOMS.

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, HUGO CARSTAEDT, of the city of New York, in the State of New York, have invented certain new and useful Improvements in Shuttles; and I do hereby declare the following is a full and exact description thereof.

My invention is intended for irregular weaving, such as corsets, where there are gores or parts in which the filling does not extend across the whole width of the goods.

In weaving such work, the shuttle is moved quite across the goods, but when the warps change their position, or, in more technical language, the shed closes and opens again, the filling-thread is embraced between the warps one-fourth, or some other small fraction of the width, and the remainder of the filling-thread extends across the goods, outside and free. On the return motion of the shuttle this thread is partially carried across or drawn across with the shuttle, but not quite.

There is liable to remain a loop or waste-thread, hanging out from the face of the goods, which is a very serious deformity.

Efforts have been made to avoid this fault by providing devices on the loom which will catch the thread and draw it tight after the return motion of shuttle, but it is difficult to adjust such mechanism so as to pull the thread with just sufficient force. If it is pulled too lightly, it leaves a small loop hanging from the face of the goods; if, on the contrary, it is pulled with too much force, it draws the warp yarns apart at the bight of the filling-thread, or the point where it turns in the goods, and thus produces an offensive aperture or hole in the goods.

My invention disposes of the slack of the filling-thread by winding it on a small roll or spool, actuated by a spring, and carried within the shuttle. All the filling-thread is delivered over or through this spool.

The mass of the filling-thread is carried on a bobbin, as usual, and the spool is made as light as possible, so that its inertia shall be insignificant.

I will proceed to describe what I consider the best means of carrying out my invention.

The accompanying drawing forms a part of this specification.

Figure 1 is a plan view from above.

Figure 2 is a plan view from below, or, in other words, a bottom view.

Figure 3 is a longitudinal vertical section.

Figure 4 is a side elevation of a slightly modified form of the light drum on which the slack thread is stored.

Similar letters of reference indicate like parts in all the figures.

A is the body of the shuttle, and *a* is the spindle, which carries a bobbin, B, as will be obvious.

The filling-thread is marked B′, and runs from this bobbin through the center of the axis *d*, of the spool D, which is hung in bearings A^1 A^2, in the end of the shuttle, as represented.

The part D *d* may be considered as a reel, spool, or drum. It is made plain, that is to say, without heads, and is preferably rounded at one or both ends, and is notched, as represented, to allow the filling-thread B′ to pass easily out from the interior of the shaft *d*, and, after extending along its exterior to about the center of its length, passes through an eye *d′*.

It is important that the hole in this eye, and also the hole in the axis *d*, shall be smooth and adapted to allow the filling-thread or yarn B′ to pass through as easily as possible.

After passing through the eye *d′* the filling-yarn B′ is wound around the drum D a few times. It is, in fact, wound and unwound at each throw, so that the quantity stored on the periphery of the drum D, varies at rapidly recurring intervals.

It passes from this drum through a smooth eye, a^1, opposite to it, in the interior of the shuttle, and from thence passes out through an eye, a^2, at or near the center of the length of the shuttle.

The drum D is actuated by a gentle spring, E, which is connected to a tough slender cord, *e*, of silk, or analogous material, which is wound and unwound upon the axis *d*.

The spring E may be the compound material of rubber and fiber commonly known as elastic. It is desirable that it shall exert a gentle and nearly uniform tension on the cord *e*, and the latter must be led through an eye, a^3, or an equivalent wheel, which shall serve as a pulley to guide the cord *e*, and cause it to wind and unwind properly.

The operation of my shuttle will now be readily understood. It may be driven by picker-sticks, or any analogous device for throwing the shuttle with a violent motion, but it is preferable to employ some of the means of actuating the shuttle more gently.

I prefer some of the devices known as positive motions, where the shuttle is moved with a gradual and moderate motion across the breadth of the goods. In either case, the first effect of drawing off any yarn is to turn the spool or drum D, and thus deliver a portion of the filling-thread B′, which has been wound around, and thus accumulated thereon.

After this has proceeded to a certain extent, and there is left on the drum D only one complete coil or less, the tension on the yarn begins to be sufficient to pull off a fresh supply from the bobbin B, which is delivered, as will be obvious, first through the

shaft *d*, then out through the side of the shaft and along the exterior of the drum D, through the eye *d'*. This provides for the delivery of fresh yarn from the bobbin B at every throw, or nearly every throw.

Any slackening of the tension on the yarn B', as it passes out through the side of the shuttle, indicative of a surplus of such yarn outside, is followed by the withdrawal of a portion of such yarn, that is to say, the constant force of the spring E is exerted to turn the light drum back again to its original position, and thus to again wind up and accumulate a quantity of the filling-yarn B' upon the exterior of the drum D, obtaining this in each instance by the indrawing or backward movement of the yarn.

It follows that, so long as my shuttle is weaving on a portion of the goods where the filling is required to extend across the full breadth, it acts substantially like the ordinary shuttle.

The first commencement of any movement may result in a momentary slackening of the filling-yarn, but, before the drum D can commence to gather in and store it, it is again drawn off, and a large quantity is delivered at each movement of the shuttle in either direction; and the same is true to some extent with the weaving of points of the gores when such points extend half way, or more than half way across the breadth of the goods, but, when it is weaving on a part of a gore which extends less than half way across the breadth, the drum D becomes useful by actually drawing in and storing a portion of the filling-thread; that is to say, when the shuttle is thrown from the edge where the gore is being woven, it unwinds the filling-yarn from the drum D, and draws off a little more from the bobbin, as before described, but on the return motion it moves across the entire breadth of the fabric without requiring to deliver any of the filling-yarn, but, on the contrary, requiring to take up the same by drawing back into the shuttle that portion which laid extending idly across on the face of the goods.

The action of my device is superior to that of a thread-catcher working as a part of the loom, because it is, in the present state of the art, impossible to make a thread-catcher which shall, like my device, take up the thread as fast as the shuttle travels.

It will be observed that when my shuttle is moved by any positive mechanism, so as to avoid the quick jerks which come from the fly-shuttle motion, my light drum D, actuated as described, can take up, and does take up the yarn as fast as the shuttle travels back upon its former path.

When the shuttle went out across the goods it laid a yarn the whole breadth of the goods. When the shed closed and opened again that act embraced the yarn for a small extent, say one-fourth, of the breadth of the goods, and left the remaining three-fourths free or loose on the face of the goods.

Now, my shuttle, traversing backward over that path, draws in and stores away that yarn as soon as it comes to it. There is no passing clear back to its state of rest, and doubling and dragging the slack of the filling-yarn with it, and leaving a portion to be finally taken up by a thread-catcher. Such an action involves a liability to entanglement which my invention avoids. With my shuttle the slack is taken up instantly, and in short, there is no slack at any period.

When my shuttle again passes the point, assumed to be at about three-fourths of its return motion, where the weaving of the gore commences, my drum D again reverses its motion, and begins to deliver yarn. It delivers it during the remainder of its motion exactly as in the ordinary manner, and the closing of the shed weaves it in with exactly the proper tension.

I have, in some of my experiments, made the drum D mainly of paper, varnished, to smooth and stiffen it. It is only essential that it be light, and sufficiently strong and stiff to endure the slight force to which it is subjected.

The form of the shuttle may be varied in various ways, and the means of securing the drum D and its shaft, as also the several eyes, may be varied according to the judgment or taste of the constructor.

The filling-yarn may, if desired, be led through the shaft *d*, or through the interior of the drum D, quite to the eye *d'*.

I do not confine myself to the arrangement of the spring herein shown. I believe it practicable to operate successfully by a spring analogous to the hair-spring of a strong chronometer, but longer, which may be mounted within the hollow paper or other light material which forms the surface of the drum, or by employing a connecting-cord, *e*, or its equivalent, substantially as herein shown.

I can replace the simple elastic, E, by a spiral spring, of hard brass, or by various other constructions.

I have operated successfully with a fly-shuttle motion, but the violence of the sudden starts is always liable to induce a derangement, by causing the inertia of the drum D to break the thread, or by causing its momentum to induce a too great motion, and thus entangle the yarn.

I esteem it highly preferable to use some means of inducing a positive, or at least a moderate motion.

Instead of a broad drum I can use a narrow wheel similarly operated. It is only essential that the motion shall be that of a smooth and almost frictionless winding. Any narrowing of the surface on which the yarn may be stored increases the chance of its becoming entangled, particularly with jerking and violent motions of the shuttle. I find the best results with about the proportions here represented.

In fig. 4 I have represented the portion of the shaft *d*, on which the cord *e* is wound, as conical, and this construction tends to equalize the action of the spring E, causing it to pull with about the same tension, whether it has been greatly extended, or has been allowed to contract, but I do not esteem this feature absolutely essential to success.

I claim—

The combination, with the shuttle, of the take-up drum, having a thread-guide, *d'*, carried thereon, with a spring, acting to turn the drum in a direction to take up and wind thereon the slack of the weft, and yielding to allow the weft to be delivered, when necessary, all substantially as herein set forth.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

HUGO CARSTAEDT.

Witnesses:

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