H. CARSTAEDT.

Improvement in Loom Shuttles.

No. 123,978. Patented Feb. 27, 1872.

Fig. 1.

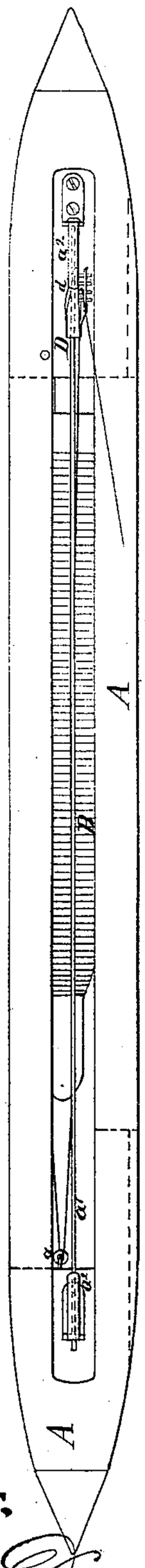


Fig. 2.

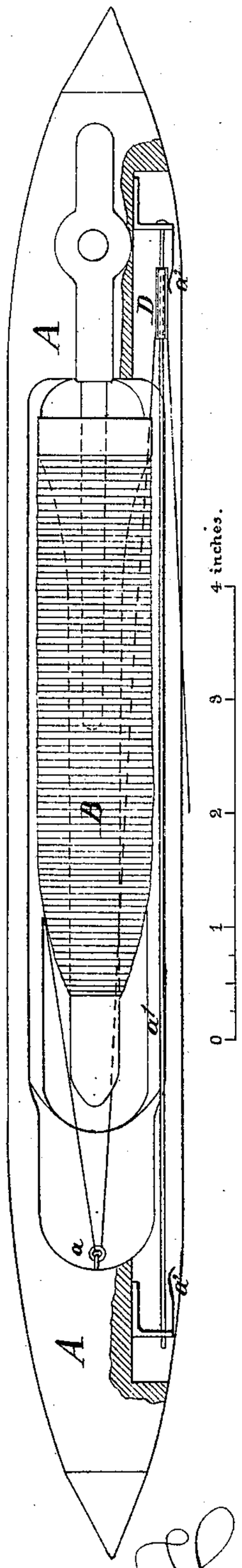
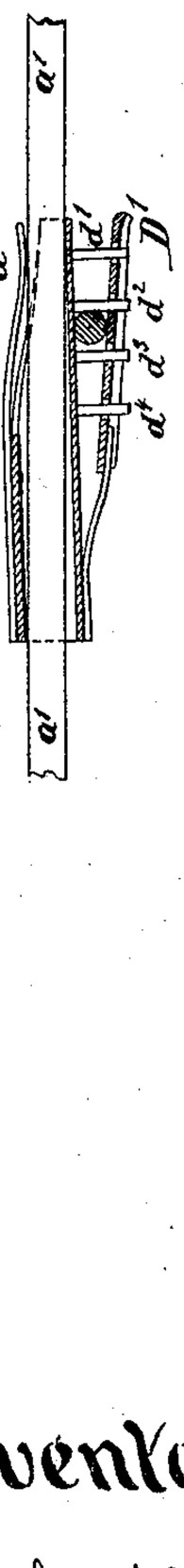


Fig. 3.



Witnesses:

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123,978

UNITED STATES PATENT OFFICE.

HUGO CARSTAEDT, OF NEW YORK, N. Y.

IMPROVEMENT IN LOOM-SHUTTLES.

Specification forming part of Letters Patent No. 123,978, dated February 27, 1872.

Specification describing an Improvement in Shuttles for Weaving, invented by HUGO CARSTAEDT, of New York city in the State of New York.

The object is to facilitate irregular weaving, such as corsets, where certain parts of the filling do not extend quite across the goods, but only from one edge inward part of the way across and then return.

A difficulty is experienced in this class of work in consequence of the tendency of the filling-yarn under such conditions to lie in a loose loop, extending further than the weaving requires. The shuttle plays, of course, quite across the goods, and a considerable distance beyond. Special "slack-gatherers" have been provided in some looms to draw back the yarn, so as to avoid the loose loop referred to; but these devices involve complications in construction and operation.

Shuttles have been provided with springs in connection with their bobbins, so that after a quantity of yarn has been delivered off it may be taken up again with a gentle force. It is hard to regulate such a device. Mine is radically different.

It is comparatively easy to make a shuttle and shuttle-boxes of any desired length. I provide a long shuttle and a movable eye or guide which is capable of sliding easily yet with a gentle resistance from near one end to the other thereof. This eye, being guided by a straight wire or other suitable guide let into one side of the shuttle, and offering a gentle resistance, as will be described, to the passage of the weft through the same, can move to either end or stand in any intermediate position on the guide. The eye is made as light as possible, so that its inertia is inappreciable. When weaving, the tension of the yarn near the end of its motion draws the eye to the extreme back end of the shuttle. This is the forward end on the return motion, and, as the shuttle runs across, the eye maintains its position at or near the front end of the shuttle until it has traversed such a distance as to deliver the yarn. Then the tension on the yarn draws the eye back to the extreme back end of the shuttle, and, during the latter part of the motion, the yarn runs out through it in that position. The return stroke repeats the operation in the opposite direction.

This is the action when the goods are being weaved of the full width across. When the loom commences to weave a gore, which is determined by the action of the harness, controlled by the Jacquard or otherwise in the usual manner, the same action ensues during the entire motion of the shuttle across in one direction. This is the motion from the edge where the gore is being woven. With the return motion the conditions are the same, except that the yarn does not commence to be delivered so early. The eye remains at or near the front end of the shuttle during the return traverse, and it pulls the yarn along with it and drags it back over the unwoven breadth of the warps until it has come to the point in the breadth where the weft commences to be engaged. Here it will be held, and the same process of drawing backward on the eye, and, if necessary, ultimately delivering the yarn through the eye during the latter part of the motion of the shuttle will be carried on as before, but with this difference, that the filling-yarn will not be delivered so early nor so much, and with the further and very important difference that, until the filling-yarn is required to be delivered, the loop will be taken up by being dragged along across that part of the breadth of the fabric which is not being woven.

At the end of the return motion in weaving a narrow portion of the goods, the eye may be found to have been drawn back to the extreme back end of the shuttle, and a small quantity of yarn delivered afterward through it; or it may be just drawn back without delivering any yarn through it; or it may be drawn only part way back; or, in an extreme instance, in the weaving of a very narrow portion, merely a few warp-yarns close to the edge of the goods being engaged. The eye may not be drawn back at all on the guide, but may remain at or near the extreme forward end of the shuttle during the whole of the return motion. It is obvious that the shuttle is capable of drawing out again all the yarn that it put in between the warps if the shuttle is sufficiently long.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawing forms a part of this specification.

Figure 1 is a side view of the shuttle, showing the delivering-eye held at the right-hand end. Fig. 2 is a plan view, partly in section,

showing the same; and Fig. 3 is a view of the eye and guiding-rod on a larger scale, with the eye free.

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

A is the body of the shuttle, and B is the bobbin, mounted on a turning-joint controlled by a spring, as usual. The filling-yarn is led from the bobbin B, first through a smooth glass eye, *a*, fixed in the interior of the shuttle, at one end, and is thence led through a light movable eye, D, which traverses on a smooth guide-rod, a^1, mounted in a broad slot, which extends along the whole length of one side of the shuttle. This movable eye embraces the guide-rod a^1, so as to afford a long bearing, and is equipped with a light spring, *d*, which presses on the guide-rod a^1, and makes a moderate but constant friction. This friction tends to hold it in whatever point on the guide-rod a^1 it may be left or placed. The weft-yarn is delivered through a device on the side opposite to the spring. I make the eye D as light as possible, but, inasmuch as its inertia is necessarily appreciable, I provide another gentle spring, a^2, at each end of the guide-rod a^1, which takes hold slightly on the eye whenever the latter is presented thereto, and, by increasing the frictional resistance to motion at that point, aids in overcoming the inertia when the shuttle is suddenly started from rest. It will be recollected that at the starting of the shuttle from rest the movable eye D is at the then forward end of the shuttle, and it is desired to keep it in that position, at or near the front end of the shuttle until all the slack weft dragging behind has been drawn properly to its place in the goods. The spring *d*, which induces a constant frictional resistance to the motion of the eye D, is aided in its conservative tendency in this position by the additional friction induced by one of the springs a^2. The tension of these latter springs should be delicately adjusted.

Absolute perfection in the working requires that the eye D shall, by its slight inertia during the starting motion of the shuttle escape from the friction of the terminal spring a^2, and, while the shuttle is flying freely across the breadth of the goods, shall remain just beyond the influence of the terminal spring, ready to be moved the moment the slightest tension is felt on the weft-yarn after its slack has been all taken up. Under these conditions it will move back with ease and certainty, so soon as the slack has been all taken up and the operation may be repeated indefinitely. If, however, the tension of the terminal springs a^2 be a little greater or a little less, the invention may still work successfully; but if its tension is less the movable eye is liable to drop too far backward on its guide-rod a^1 during the starting motion of the shuttle, and thus not to take up the slack of the warp perfectly. Or if, on the other hand, the tension of the terminal springs a^2 is too great, it is liable, by holding onto the movable eye D, after the shuttle is fairly flying, to induce, by the combined frictional resistance of itself and the constant spring *d*, so great a resistance to the ultimate backward motion of the eye that the combined tension on the weft-yarn when the slack is all taken up, and it is called upon suddenly to be delivered, may cause it to break.

My experiments induces a belief that a sufficiently near approximation to the proper tension of these springs may be maintained with little difficulty.

I provide several pins, d^1, d^2, d^3, &c., on the side of the eye opposite to the spring *d*, and make the spaces between them as smooth as may be, and sufficiently wide to allow the free and easy traverse of the filling-yarn, and provide the friction-piece D′, mounted on the traversing eye D by a spring connection at one end. This friction-piece D′ is perforated to receive the several pins d^1, d^2, &c. The weft-yarn is led through between a pair of pins under the gentle pressure of the friction-piece D′. When it is desired to increase or reduce the frictional resistance the weft-yarn is shifted from one position to another between the pins—that is to say, to increase the friction, the yarn is shifted from its place between the pins d^1 d^2 to a new position between the pins d^2 d^3. Here, being nearer to the spring end of the friction-piece, the tension thereof is greater, and the friction is proportionately increased.

In cases where, from extreme delicacy of the weft-yarn or from other reason, it is desirable to reduce the tension on the weft to the least possible degree, I will employ a plain loop of extremely light wire in place of the several pins d^1, d^2, and the friction-piece D′, thus lightening the movable eye still further.

I claim as my invention—

1. The shuttle A, provided with a way, a^1, and an eye, D, traveling thereon, as shown, having a nearly uniform sectional resistance, so that the eye will be drawn to one end of the shuttle by the tension of the thread at the end of one throw, and will remain there during the return motion until drawn again to the other end by the tension, as herein specified.

2. The friction spring *d* on the movable eye D, in combination with the shuttle A, and arranged to induce a constant slight frictional resistance to the motion of the eye, as specified.

3. The terminal springs a^2 a^2, in combination with the movable eye D and the constant friction spring *d*, as specified.

4. The pins d^1, d^2, d^3, and the friction-piece D′, matching thereon, and connected by a spring to the movable eye D, and adapted to induce an adjustable tension on the weft, as specified.

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

HUGO CARSTAEDT.

Witnesses:

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