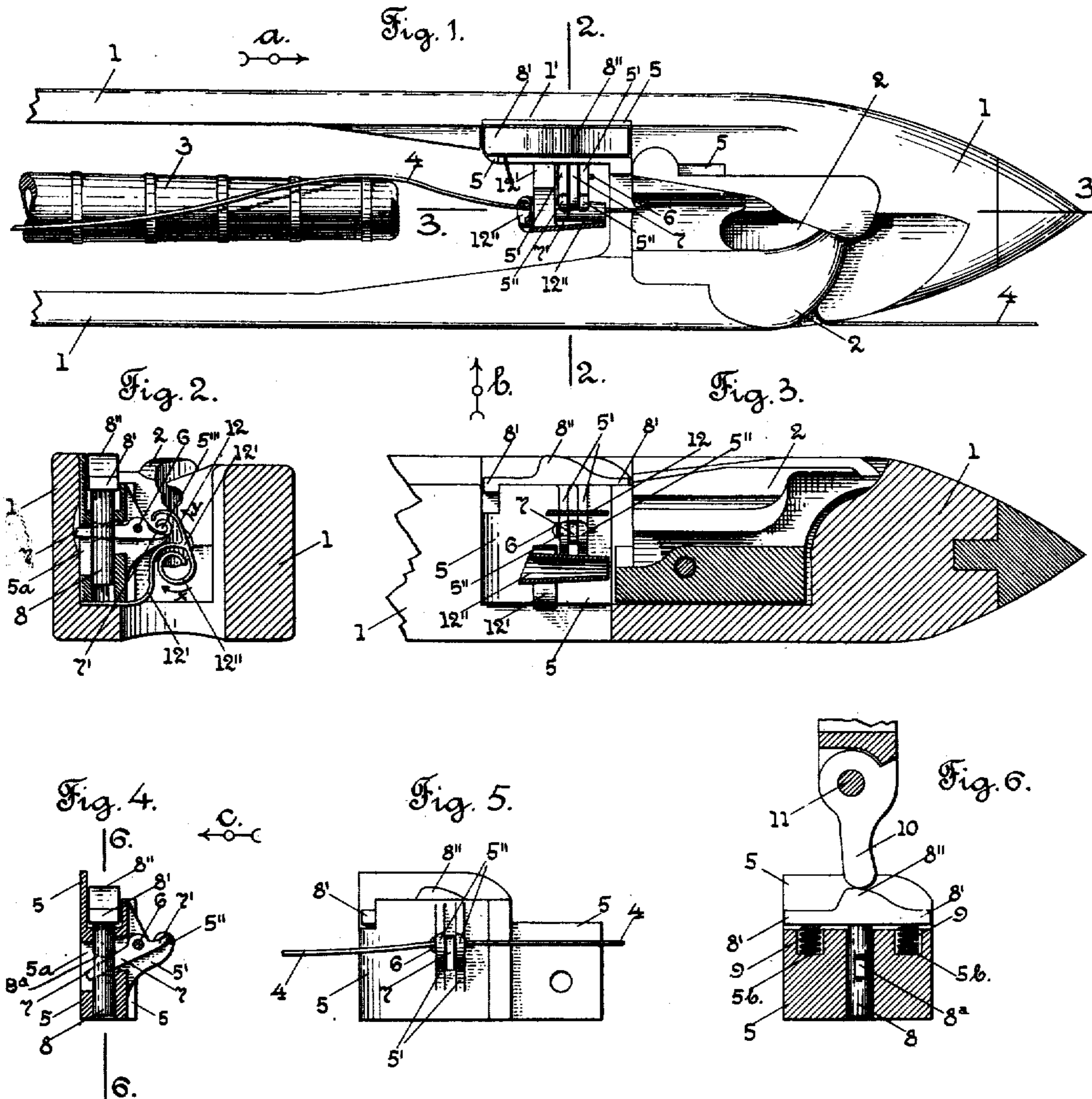


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SHUTTLE.

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SHUTTLE.

No. 914,703.

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To all whom it may concern:

Be it known that I, RANDOLPH CROMPTON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Shuttles, of which the following is a specification.

My invention relates to a shuttle particularly adapted to be used in ordinary looms or in weft replenishing looms, in which a new filling carrier or bobbin is inserted when the filling in the running shuttle is substantially exhausted, and my invention particularly relates to an automatic filling thread cutting device, combined with a shuttle, and adapted to operate to cut the filling on the filling carrier or bobbin, when the filling is substantially exhausted, and prior to the insertion of a new filling carrier or bobbin in the shuttle.

In weft replenishing looms in which self-threading shuttles are used, mechanical, electrical, or magnetic means are employed to detect the substantial exhaustion of filling on the bobbin in the running shuttle, and indicate for the operation of the weft replenishing mechanism, and the insertion of a new bobbin in the running shuttle. The amount of waste filling left on the substantially exhausted bobbin when ejected, preparatory to the insertion of a new bobbin, is always considerable, but varies somewhat according to the greater or less sensibility of the detecting mechanism.

The object of my invention is to do away entirely with mechanical, electrical, or magnetic detecting mechanism in weft replenishing looms, to detect the amount of filling on the bobbin in the running shuttle, and to provide in lieu thereof a thread severing or cutting device combined with a shuttle, by means of which the filling on the bobbin will be severed or cut when the last few winds of filling are being drawn off from the bobbin.

In my improvements, I have a filling thread cutting device, which is automatically operated, independently of the discharge of the filling carrier from the shuttle and preferably a guide for the filling combined with said cutting device. The filling is preferably held or retained in one position by the guide during the drawing off from the bobbin of the main part of the filling, and is then held or retained in another position by the guide when the last few winds of the filling are drawn off, and preparatory to the cutting of the filling be-

fore it is all drawn off from the bobbin by the movement of the shuttle.

The filling on a bobbin used in a shuttle in a weft replenishing loom, is wound in one direction, and the free end of the filling is fastened to some part of the loom, or held in some way, and when the bobbin is transferred from the magazine and inserted in the running shuttle, to take the place of a substantially exhausted bobbin, the filling, as it is drawn off of the bobbin during the movement of the shuttle across the lay, is by the threading mechanism ordinarily employed on the shuttle automatically threaded into the eye of the shuttle.

A filling carrier or bobbin used with my improvements in a shuttle, instead of having all the filling on the filling carrier or bobbin wound thereon in one direction, as is customary, has the first few winds in one direction, the amount of filling wound in said direction being sufficient for one or more picks of the shuttle across the lay, and the remaining winds of filling on the filling carrier or bobbin, are wound in a reverse direction. After the main body of the filling has been drawn off from the bobbin by the movement of the shuttle, said filling having a circular movement in one direction, and the filling wound in the reverse direction is reached, then said filling will have a circular movement in the reverse direction. The circular movement of the filling, as it is drawn off of the filling carrier or bobbin, causes it to be held or retained in one position as long as the filling is unwound in one direction, but as soon as the filling begins to unwind in the reverse direction, the circular movement of the filling in that direction causes it to take a different position, which I term an abnormal position, and be held or retained preparatory to being cut by the cutting device. The cutting device is automatically operated in any suitable manner and independently of the discharge of the filling carrier from the shuttle, and as shown and described herein, by a trip attached to the hand-rail, or mounted on the shuttle box. The cutting of the filling causes the operation of the weft replenishing mechanism, as above stated, and the supply of fresh filling. The weft replenishing mechanism, and mechanism connected therewith, put into operation on the failure of filling in the running shuttle by the cutting thereof, will form the subject-matter

of another application, and are not included herein.

I have only shown in the drawings a detached portion of a self-threading shuttle of ordinary construction, with my improvements combined therewith, sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings:—Figure 1 is a plan view of one end of a self-threading shuttle with my improvements combined therewith. Fig. 2 is a transverse section, on line 2, 2, Fig. 1, looking in the direction of arrow *a*, same figure. Fig. 3 is a central longitudinal section, on line, 3, 3, Fig. 1, looking in the direction of arrow *b*, same figure. Fig. 4 shows the cutting device shown in Fig. 2, detached, and in a different position. Fig. 5 is an inside view of the thread cutting device, looking in the direction of arrow *c*, Fig. 4. Fig. 6 is a partial section, on line 6, 6, Fig. 4, looking in the direction of arrow *c*, same figure, and also shows a supplemental device for operating the cutter.

In the accompanying drawing, 1 is a portion of a shuttle, 2 a threading device of any usual and well known construction, and combined with the end of the shuttle 1; 3 is the top or outer end portion of a bobbin on which the filling is wound, and 4 is the filling leading from the bobbin 3.

I will now describe my improvements, combined in this instance with the shuttle, having the self-threading device shown in the drawing.

The back wall of the shuttle 1 is in this instance recessed at 1' to receive a block 5, preferably made of hardened steel, which is secured in place by screws or rivets, or in any other suitable manner. The block 5 has in this instance two arms or projections 5', which extend inwardly therefrom, and have their inner ends curved upwardly and backwardly, as shown at 5'', to form an eye 5''', see Fig. 2, for the filling thread 4.

Extending loosely between the arms 5', and pivotally mounted on a pin 6 secured in said arms, is in this instance a lever 7, the inner upper edge of which is sharpened to form a cutting edge or surface 7', to cut the filling within the eye 5'''. The cutting lever 7 has its rear end extend outwardly through an opening 5^a in the block 5, see Fig. 4, and also through an opening 8^a in a bolt 8, see Fig. 4, which bolt is loosely mounted in a vertically extending hole in the block 5. The bolt 8 has a head or outer surface 8', which has thereon in this instance, a curved or cam-shaped surface 8''.

Two helically coiled expansion springs 9, in this instance extend within openings 5^b in the block 5, see Fig. 6, and bear at one end against the inner end of said openings, and at their other end against the inner surface on the head 8' on the bolt 8, and act to yield-

ingly hold said head and bolt in their outer position. The cam-shaped head 8' on the bolt 8, in this instance extends on the top or upper surface of the shuttle, and in the path of a latch or trip 10, see Fig. 6, in this instance, pivotally mounted on a stud 11 on the hand-rail, or some part of the shuttle box, not shown. As the shuttle enters the box in its passage across the lay, the cam shaped head 8' on the bolt 8 is engaged by the trip or latch 10, and the head 8' and bolt 8 are moved inwardly, causing the cutting lever 7 to move on its pivot pin 6, and the cutting edge 7' on said cutter lever to be moved to engage and cut the filling thread, in case it passes through the eye 5''', as shown in Fig. 4.

The filling guide 12 shown in this instance is made of thin sheet metal and preferably of the shape shown in Fig. 2, and provided with an attaching arm or support 12', in this instance secured to the lower edge of the block 5, or between the lower edge of said block and the shuttle body, see Fig. 2. The lower part 12'' of the filling thread guide 12 is in this instance of spiral shape, and is bent right handed, as shown in Fig. 2, so that the filling thread 4, which unwinds from the bobbin 3 in the direction indicated by the arrow *x*, Fig. 2, will have a circular movement, and will follow the curvature of the guide portion 12'', and enter the opening into the funnel-shaped guide portion 12'', as shown in Fig. 1, and be retained therein as long as the filling 4 is drawn off from the bobbin 3 with the right hand wind, but when the filling wound with the right hand wind on the bobbin has been drawn off, and the filling with the left hand wind is reached, the unwinding of the filling having the left hand wind causes the filling to have a circular movement in the opposite direction, and to pass out of the funnel-shaped guide portion 12'', and to pass up in the direction of the arrow *y*, and over the upper end of the guide 12, and into the eye 5''' on the arms 5, so that the movement of the cutting lever 7, above described, through the operation of the trip, or other device 10, will cut the filling thread extending through the eye 5'''. The failure of the filling thread will, through suitable mechanism not shown or described herein, but forming the subject-matter of another application, put into operation the weft replenishing mechanism to supply fresh filling, or operate, to stop the loom.

The advantages of my improvements will be readily understood by those skilled in the art. They are of very simple construction and may be combined with any ordinary self-threading shuttle.

In using my improvements, the filling thread on the bobbin will first be given a few winds in one direction, as a left hand wind, to furnish sufficient filling for one or more

picks of the shuttle, and will then be given a wind in the reverse direction, as a right hand wind, until the bobbin is fully wound, as above described. When the bobbin is inserted in the shuttle from the west replenishing mechanism, the filling is threaded into the eye of the shuttle by the threading mechanism, and as the filling is drawn off of the bobbin, it is carried by its circular movement into the funnel-shaped guide 12", or its equivalent as above described, and remains in said guide, allowing the cutting lever 7 to be operated at every other pick of the shuttle, without interfering with the ordinary operation of the shuttle, until the filling with the right hand wind has been entirely drawn off from the bobbin, and the filling with the left hand wind has been reached. Then by reason of the left hand wind of the filling, the filling is caused to have a circular movement in the reverse direction, to pass out of the funnel-shaped guide 12", and pass up into the eye 5", in a position to be engaged by the cutting lever 7 at the next operation of said cutting lever.

It will be understood that the details of construction of my improvements may be varied if desired, and particularly the construction and arrangement of the guide for the thread cutting device, and they may be adapted to be combined with shuttles of different construction.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a shuttle, a filling carrier having two winds in reverse directions, a thread cutting or severing device, having a guide or eye adapted to receive the filling as the shuttle

is thrown through the shed, when the reverse wind of the filling is being withdrawn from the carrier.

2. In a shuttle, a wound filling carrier, and a cutting or severing device interposed between the tip of the filling carrier and the delivery eye of the shuttle, and located on the opposite wall of the shuttle from said delivery eye, said cutting or severing device provided with two self-threading guides or eyes, one of said guides for the reception of the filling as the filling is unwound in one direction, and the other guide for the reception of the filling unwound in the reverse direction, and means acting with the latter guide to cut or sever the filling.

3. In a shuttle a filling carrier, having two winds in reverse directions, a thread cutting or severing device adapted to cut or sever the filling as the shuttle is thrown through the shed, after one wind on the filling is exhausted, and while the other wind is being drawn off from the filling carrier.

4. A shuttle having a thread cutting or severing device, with a guide or eye, adapted to receive the filling as the shuttle is thrown through the shed, when the reverse wind of the filling is being withdrawn from the carrier in the shuttle.

5. A shuttle having a cutting device, with a self-threading eye, opened at its upper side for the reception of the filling on the filling carrier in the shuttle, when said filling becomes reversed in unwinding, during the flight of the shuttle.

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