Feb. 19, 1952 M. R. FLAMAND 2,586,638

FILLING CARRIER FOR SHUTTLELESS LOOMS

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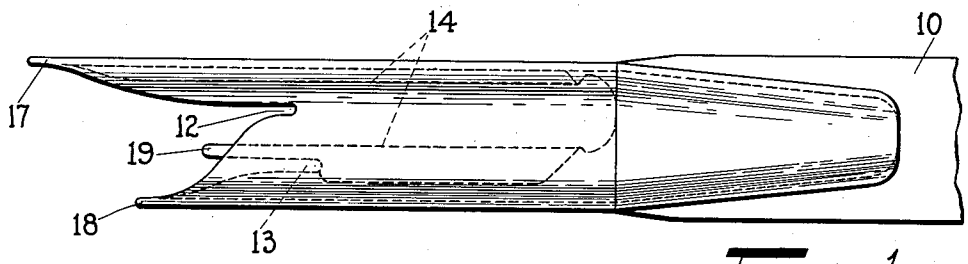


Fig. 1

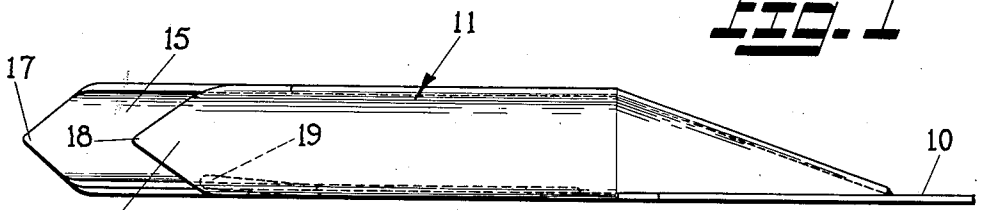


Fig. 2

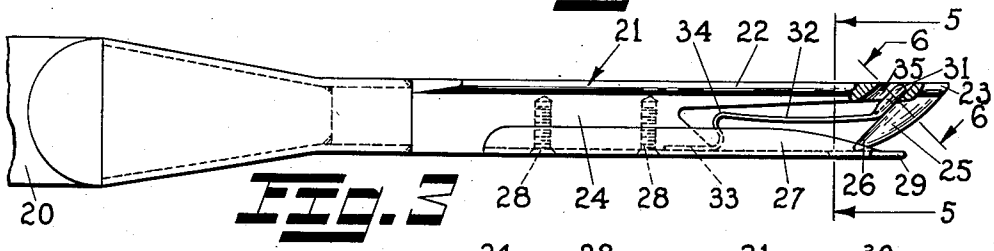


Fig. 3

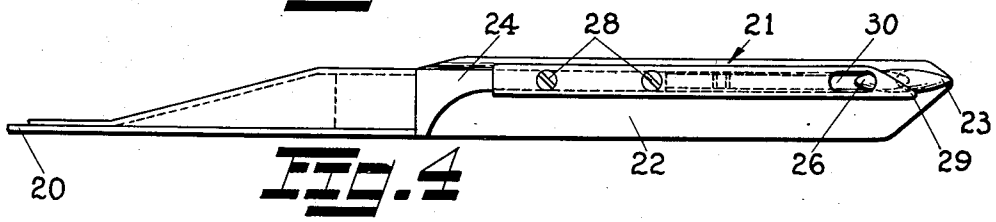


Fig. 4

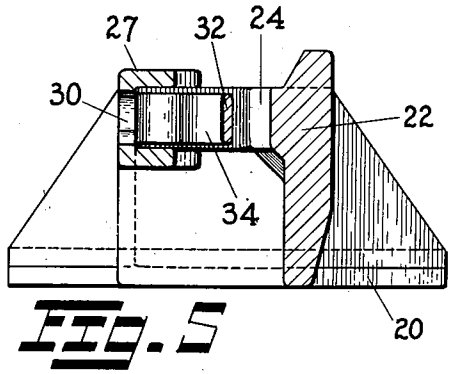


Fig. 5

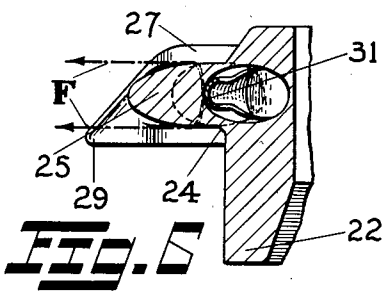


Fig. 6

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FILLING CARRIER FOR SHUTTLELESS LOOMS

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This invention pertains to improvements in filling carriers for use in shuttleless looms, that is, looms of a type in which the filling is supplied from a source outside of the shuttle or filling inserting means itself.

It is a general object of the invention to improve the construction and operation of filling handling carriers of the type described and to assure that the filling is drawn through the shed of the fabric under an equal amount of tension at each successive pick despite the fact that the loose end of filling may be drawn first beneath the carrier and then above it.

It is a more specific object of the invention to attain the above mentioned desired results by improving that part of a filling carrier of the type described which draws the loose end of each pick of filling through to the extreme edge of the fabric being woven, and so devising the tensioning means through which the filling is drawn that an equal amount of tension is applied thereto regardless of the direction in which the filling is moving.

In so-called shuttleless looms, that is, those looms in which filling is supplied from an outside source and is not carried to and fro through the shed by the shuttle or carrier itself, it is customary to insert each pick of filling by two reciprocating elements, one of which may hereinafter be referred to as an inserter or inserting member and the other of which receives or has transferred to it that loop of filling projected into the shed by the first member and which may hereinafter be referred to as a filling receiving or filling extending carrier. This latter member is normally provided with a hooked element by which the filling is seized and trapped and through which or past which the filling may move endwise so that the action of the carrier to which the said inserted loop is transferred is one of merely drawing through or extending an end which will have been severed to the precise length to complete the pick. It is customary to provide some sort of tensioning means functioning in cooperation with the hooked member on such filling extending carriers and it is this combination of elements with which the instant invention is concerned.

In these looms it is sometimes customary to draw the filling in such manner that the loose end thereof is drawn beneath the carrier at one pick, and at the next or some succeeding pick inserted from the same side, and preferably being interconnected at that side by a selvage loop to the preceding pick, the thread may then be

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drawn from a supply in such manner that the loose end thereof is drawn above, or at least at the opposite side of the carrier from that at which the first of the connected pair of picks was drawn. The result of this is that in all carriers employed up to this time, there has been a difference in tension and in the behavior of the picks of filling since the said carriers have obviously been designed to apply tension to the yarn while the same has been drawn in one direction only.

In carrying the invention into practice and in simplifying the mechanism itself thereby to provide a relatively inexpensive, simple and more or less trouble free device, it has been found possible to devise a particular loop receiving and filling end extending carrier member by which the tension conditions prevailing at succeeding picks is, to all intents and purposes, substantially identical even though every other pick inserted is drawn through under exactly opposite conditions.

The invention will hereinafter be described in greater detail by reference to the accompanying figures of drawing in which:

Fig. 1 is a plan view showing the operating end of a filling inserting carrier for use with shuttleless looms of the type described.

Fig. 2 is an elevation of that carrier shown in Fig. 1.

Fig. 3 is a plan view of the cooperating filling receiving and extending carrier which functions in conjunction with the inserter of Figs. 1 and 2 and to which the instant invention has been applied.

Fig. 4 is an elevation of the filling extending carrier of Fig. 3.

Fig. 5 is a section taken at line 5—5, Fig. 3.

Fig. 6 is a section taken at the line 6—6, Fig. 3, and showing the manner in which the filling thread is tensioned as it is drawn through the carrier in either direction.

Now referring to the figures of drawing, the carriers which may be formed as more or less functionally integral portions at the ends of reciprocating members such as the so-called needles or rapiers employed in some looms, or flexible elements such as have been used in others, are caused to function in a manner well known to those conversant with this art, and it is considered sufficient at this point merely to call attention to certain patents which are illustrative of the type of loom concerned. Accordingly, attention is drawn to patents, numbered 1,515,102, 1,883,354 and 2,191,376.

Preferably flexible carriers or tapes 10 are used

to reciprocate the thread carrying members themselves which are caused to enter the shed and to be withdrawn therefrom, passing inwardly to a point somewhere adjacent the center of the shed of the fabric at which the transferring function, i. e., a gripping of the loop by the filling extending carrier and releasing thereof from the inserter, is caused to take place. Fixed in any suitable fashion to the tape 10 is a somewhat boxlike structure generally indicated by numeral 11 and comprising a top, planar portion having a notch 12 which cooperates with an offset notch 13 in the lower portion of the boxlike structure. This lower portion is also cut away to an extent defined by the parallel sides 14, this recess or cut out portion providing for entry of a cooperating part of the carrier of Figs. 3 and 4 as will later be described. The offset of the notches 12 and 13 from the true vertical is practicable since the thread is held at an incline corresponding thereto as it is picked up incidental to being inserted. Of course, it is to be understood that the filling thread is supported outside or at any convenient point at the end of the loom structure and a stretch thereof is caused to assume a proper position to be engaged by the inserter by filling handling means not necessary of description here.

The inserter has side members 15 and 16 that present points 17 and 18 which facilitate the entry and passage of the carrier through the open shed. The point 19 which completes one of the bounding sides of the notch 13 is caused to assume a somewhat elevated position as illustrated in Fig. 2 by bending the metal upwardly so as to avoid any possibility of this part of the inserter catching on the warp threads over which the lower surface of the carrier passes during its inserting movement.

Now referring to Figs. 3 and 4, a flexible tape 20 similar to the tape 10 carries at its free end a filling gripping and extending member generally indicated by numeral 21 and comprising a vertical side plate 22 which at its forward end terminates in a point 23 similar to one of the points 17 and 18, and being disposed at substantially the same level. The plate 22 is supplemented by a web 24, the two forming somewhat of a T-shaped section and being attached by brazing or in any other satisfactory manner to the tape 20, the end of which is tapered to blend into the general dimensions of the filling gripping and withdrawing member itself.

The end 23 of the plate 22 is preferably formed to provide an integral hook member 25, this projecting in a direction as illustrated and at more or less of a 45 degree angle to terminate in a point 26 which cooperates with a trapping guard member 27. The latter is suitably attached to web 24 by means of screws 28, and is of general U or channel section as illustrated more clearly in the section of Fig. 5. The sides of the channel are tapered so that the trapping guard terminates in a tip 29, and, just in back of this tip and opposite the point 26 of the hook 25, is an elongated opening 30 within which or close to which the point cooperates in such a manner that the filling thread extending between the notches 12 and 13 of the inserter and under a sufficient amount of tension, is passed to become trapped. The effect of the angular disposal of the hook 25 and the tip 29 of the guard is such that it is very easy for the thread to enter past the point 26, but it is practically impossible for it to be withdrawn or to escape therefrom. The result is that a very easy transfer of the filling loop from the carrier

to the withdrawing and extending member is effected, but once having been transferred, the only manner in which the filling can be withdrawn from the latter is that of endwise movement past the hook 25.

The filling obviously should be controlled to some extent as it is withdrawn and extended to the opposite end of the fabric and for that purpose it has generally been customary to employ some type of tensioning means. Here a resiliently applied tension member or pad 31 is formed at the end of a more or less elongated spring strip 32 which is clamped or otherwise held as at 33 between the channel of the guard and the adjacent surface of the web 24. Other means of attachment may be employed so long as the tension member is maintained in proper position and so long as the flexibility of the spring portion 32 is not impaired.

The tension pad 31 is arched in cross section as illustrated at Fig. 6 and is for a considerable extent in pressure engagement with the adjacent surface of the hook 25. The spring portion 32 is formed into a reverse curve at 34, or is in some other manner fashioned so that the thread if it passes to the rear of the opening provided between the said member 32, the guard 27 and the hook 25 does not become pinched or otherwise adversely affected by its contact with the surfaces of the bounding or restraining portions of the said members. The curvature of the pad 31 serves to permit a knot or slub to pass through the carrier with a minimum of added strain on the filling.

The thread or filling naturally tends to draw up into the notch formed by the hook 25 and the inner surface of the plate 22, it being understood that suitable fillets or rounded corners are provided at all intersecting surfaces thereby to prevent any fraying or cutting of the filling which necessarily moves very rapidly over these surfaces once the transfer has been effected and the carrier starts to be withdrawn to effect the completion of extending the filling pick throughout the entire shed. In order to provide for continuous parallelism and tendency toward contact between the tension member 31 and the surface of the hook, especially at the point at which the filling actually tends to run, an aperture 35 is cut or otherwise provided in the plate 22 and so that the inner surface of the aperture most closely adjacent the point 23 is really a continuation of the surface of the hook 25 over which the filling passes. This aperture 35 is of sufficient size to permit entry of the tension member 31 and free movement thereof as the filling may cause that tension member to vibrate slightly due to variations in diameter of filling or passage of knots or other imperfections.

The hook 25 and the tension means 31 are so formed symmetrically about a central horizontal plane passing through their vertical mid point that, as illustrated in Fig. 6, filling F moving in either direction must necessarily be subjected to substantially the same amount of tension. The cross section of the hook 25 is of modified oval form and is symmetrical about the central plane above mentioned, the curved section of the pad 31 being similarly symmetrical and the bearing surface between these two elements is also so disposed that an equal portion thereof extends to either side of the said central plane. Of course, in theory it might be considered that these elements bear at a line, but the cooperating surfaces of the members recede so gradually that there

is really an appreciable area of each of the members which is in contact with the other. This symmetrical form of the parts in cooperation with the other features above described makes it possible to weave without attempting to maintain a definite relationship between the free end of the filling and the cooperating carriers at each pick. In other words, it is not necessary to provide for drawing the filling through the receiving and extending carrier or past the hook **25** and the pad **31** in the same direction as has heretofores been practiced, the particular construction of the parts as herein specifically described thus making it possible to simplify the entire procedure and mechanism involved without an undesirable difference in tension which has otherwise frequently caused trouble.

The invention has been described as applied to a particular type of shuttleless loom and by illustrating and describing its application to filling carriers of one particular design, however, it is to be understood that the principles thereof apply to all looms falling within the general category mentioned and that the principles of the invention are also applicable to filling carriers functioning in the same general manner, although the specific details thereof may take rather widely different forms.

The carriers to which reference here has been specifically directed are horizontally disposed, that is, the hook and the notched portions of the inserter lie in a generally horizontally disposed plane. Nevertheless, if the parts were to be operated at another angular relationship, the reference to a basic horizontal plane then would necessarily be modified accordingly.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This application is, therefore, not to be limited to the precise details described, but is intended to cover all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

I claim:

1. For a loom having reciprocable carriers by which filling from an outside source of supply is inserted within sheds formed by warp threads, a filling extending carrier for receiving a loop of filling from a companion carrier adapted to insert that loop part way through a warp shed, and for drawing an end from said filling loop across the remainder of the shed, which comprises a hooked member and a trapping guard cooperating with said hooked member to define a filling confining opening through which the filling is drawn, and a resilient filling tensioning means in pressure contact with a part of the surface of said hooked member, the cross sections and relative disposal of said hooked member and tensioning means being such that an equal amount of tension is applied to filling drawn through said carrier in either direction.

2. For a loom having reciprocable carriers by which filling from an outside source of supply is inserted within sheds formed by warp threads, a filling extending carrier for receiving a loop of filling from a companion carrier adapted to insert that loop part way through a warp shed, and for drawing an end from said filling loop across the remainder of the shed, which comprises a hooked member and a trapping guard cooperating with said hooked member to define a filling confining opening through which the filling is drawn, and spring tensioning means supported within the opening through which the filling runs and having a part thereof in pressure contact with the surface of the hooked member over which the filling is drawn, said hooked member and tensioning means between which the filling is drawn being symmetrically disposed about a horizontal central plane through them thereby to tension filling equally as it is drawn in either direction.

3. For a loom having reciprocable carriers by which filling from an outside source of supply is inserted within sheds formed by warp threads, a filling extending carrier for receiving a loop of filling from a companion carrier adapted to insert that loop part way through a warp shed, and for drawing an end from said filling loop across the remainder of the shed, which comprises a hooked member and a trapping guard cooperating with said hooked member to define a filling confining opening through which the filling is drawn, and spring tensioning means supported within the opening through which the filling runs and having a part thereof in pressure contact with the surface of the hooked member over which the filling is drawn, first in one direction and then in the opposite direction, said hooked member having a cross section symmetrically disposed about a horizontal plane taken centrally thereof and said tension means having a cross section at that portion thereof at which it engages filling to be tensioned such that it bears evenly at either side of the said central plane thereby to tension the filling equally as it is drawn in either direction.

4. For a loom having reciprocable carriers by which filling from an outside source of supply is inserted within sheds formed by warp threads, a filling extending carrier for receiving a loop of filling from a companion carrier adapted to insert that loop part way through a warp shed, and for drawing an end from said filling loop across the remainder of the shed, which comprises a hooked member and a trapping guard cooperating with said hooked member to define a filling confining opening through which the filling is drawn, and a resilient tensioning means supported within the opening through which the filling runs, said means having a part thereof in pressure contact with the surface of the hooked member over which the filling is drawn, and an elongated extension thereof from the first mentioned part to the support, said extension having therein a curved offset forming with said guard a pocket into which the filling may move but of such form that there can be no tension applied to the filling thereby.

5. For a loom having reciprocable carriers by which filling from an outside source of supply is inserted within sheds formed by warp threads, a filling extending carrier for receiving a loop of filling from a companion carrier adapted to insert that loop part way through a warp shed, and for drawing an end from said filling loop across the remainder of the shed, which comprises a hooked member and a trapping guard cooperating with said hooked member to define a filling confining opening through which the filling is drawn, and a spring tension means supported to extend within the opening through which the filling runs and having an end portion extending in parrallelism with an adjacent surface of the hooked member and in pressure contact therewith at that portion of the hooked member over which the filling is drawn, said hooked member having a cross section symmetrically disposed about a horizontal plane taken centrally thereof and said tension means having a cross section at that position

thereof at which it engages filling to be tensioned such that it bears evenly at either side of the said central plane thereby to impart an equal amount of tension to the filling as it is drawn in either direction.

6. For a loom having reciprocable carriers by which filling from an outside source of supply is inserted within sheds formed by warp threads, a filling extending carrier for receiving a loop of filling from a companion carrier adapted to insert that loop part way through a warp shed, and for drawing an end from said filling loop across the remainder of the shed, which comprises a hooked member and a trapping guard cooperating with said hooked member to define a filling confining opening through which the filling is drawn, and spring tensioning means supported within the opening through which the filling runs and having a part thereof in pressure contact with the surface of the hooked member over which the filling is drawn, an aperture a portion of the bounding surface of which merges with and forms an extension of the surface of the hook against which the tensioning means bears, said tensioning means extending into said aperture.

7. For a loom having reciprocable carriers by which filling from an outside source of supply is inserted within sheds formed by warp threads, a filling extending carrier for receiving a loop of filling from a companion carrier adapted to insert that loop part way through a warp shed, and for drawing an end from said filling loop across

the remainder of the shed, which comprises a hooked member and a trapping guard cooperating with said hooked member to define a filling confining opening through which the filling is drawn, and spring tensioning means supported within the opening through which the filling runs and having a part thereof in pressure contact with the surface of the hooked member over which the filling is drawn, an aperture a portion of the bounding surface of which merges with and forms an extension of the surface of the hook against which the tensioning means bears, said tensioning means extending into said aperture, said hooked member and tensioning means between which the filling is drawn being symmetrically disposed about a horizontal central plane through them thereby to tension filling equally as it is drawn in either direction.

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