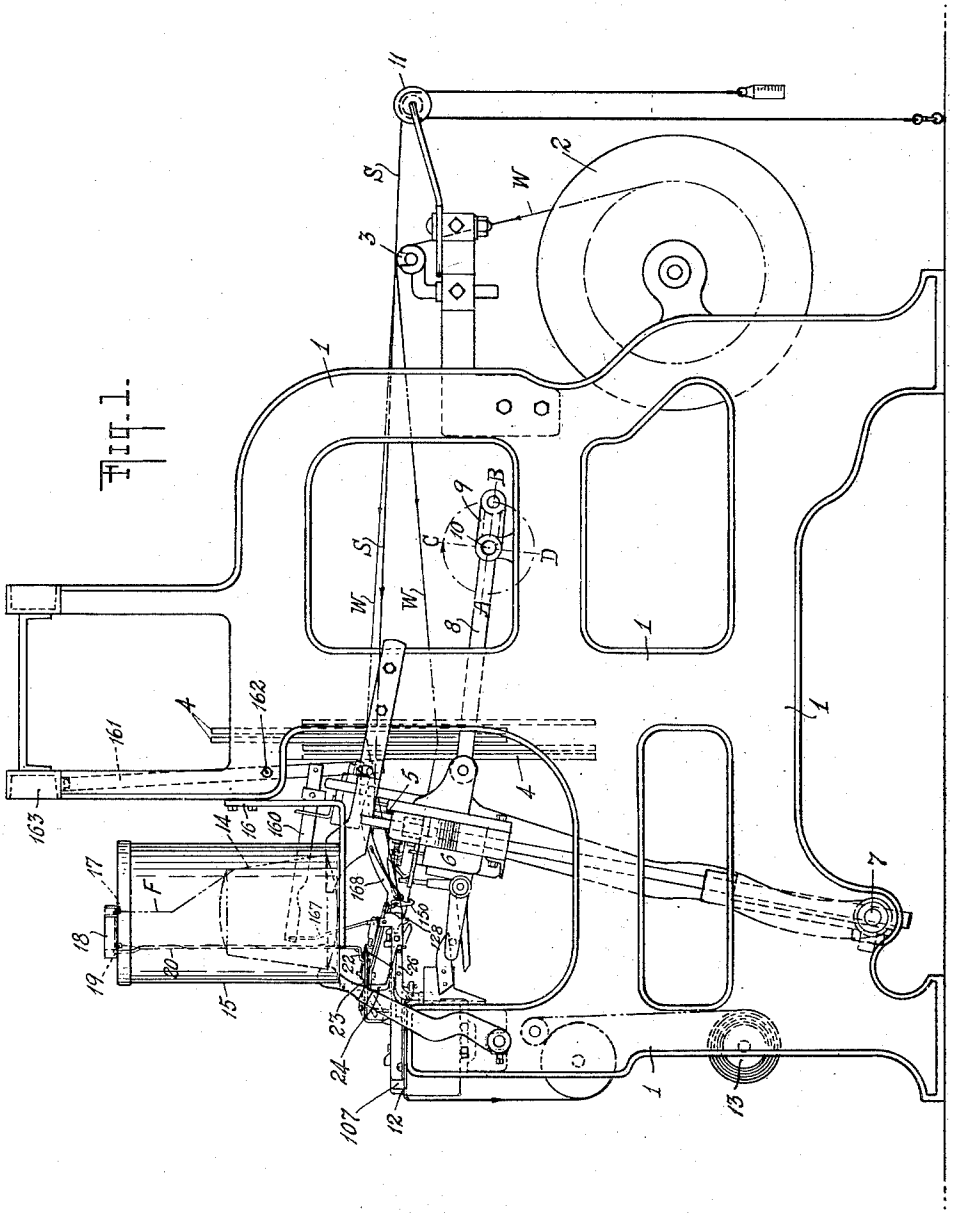
May 1, 1945. A. R. PEDRAZZO ET AL 2,374,951

LOOM

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Fig. 1.



INVENTORS
EMIL R. PEDRAZZO
ADONE R. PEDRAZZO
BY
Briesen & Knauth,
ATTORNEYS

May 1, 1945. A. R. PEDRAZZO ET AL 2,374,951

LOOM

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Fig. 2.

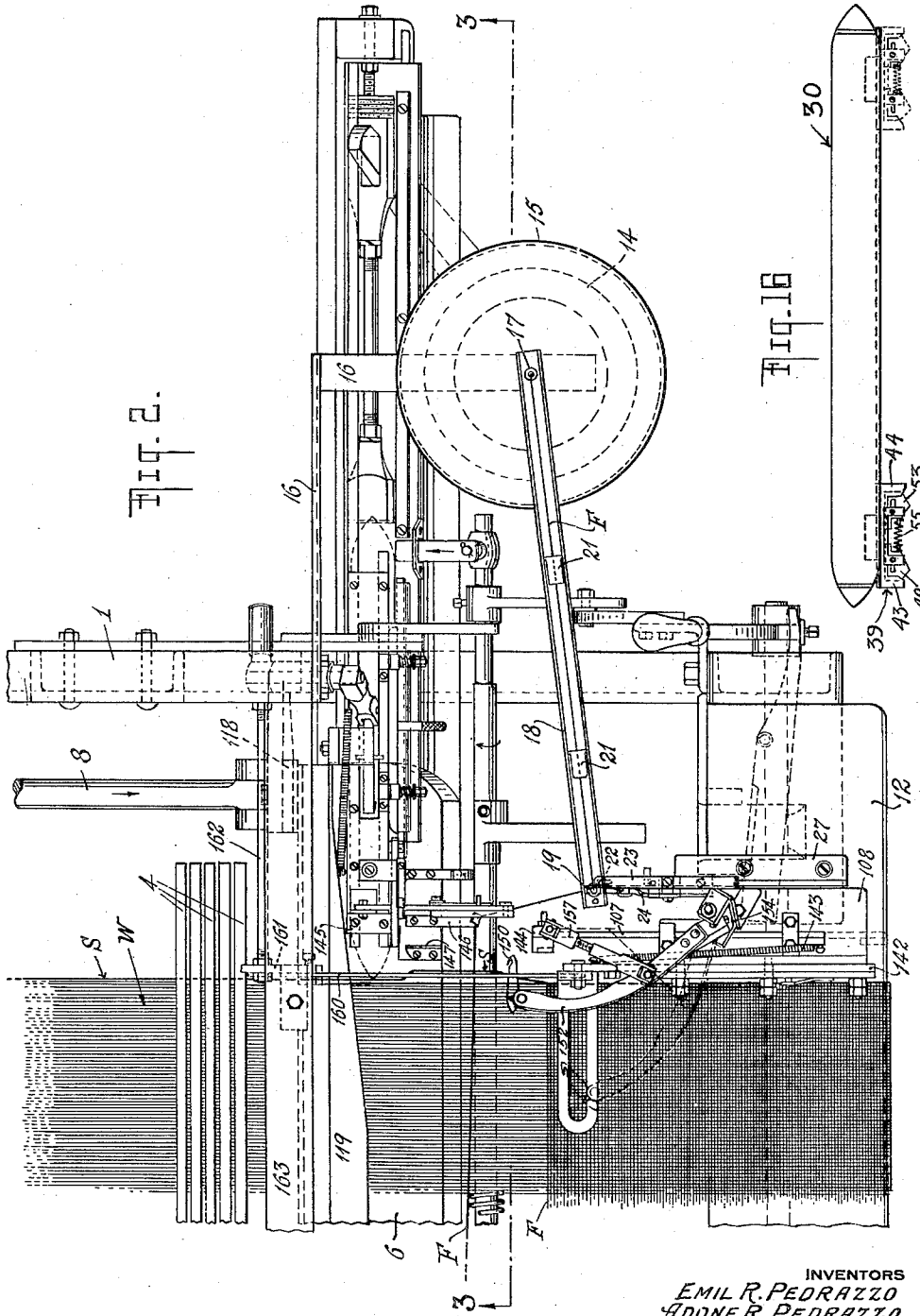


Fig. 1B

INVENTORS
EMIL R. PEDRAZZO
ADONE R. PEDRAZZO
BY
Briesen & Ahrens,
ATTORNEYS

May 1, 1945. A. R. PEDRAZZO ET AL 2,374,951

LOOM

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FIG. 3.

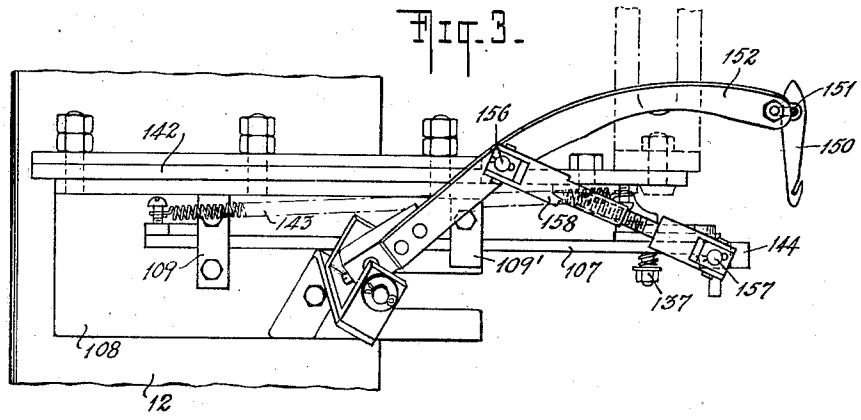


FIG. 4.

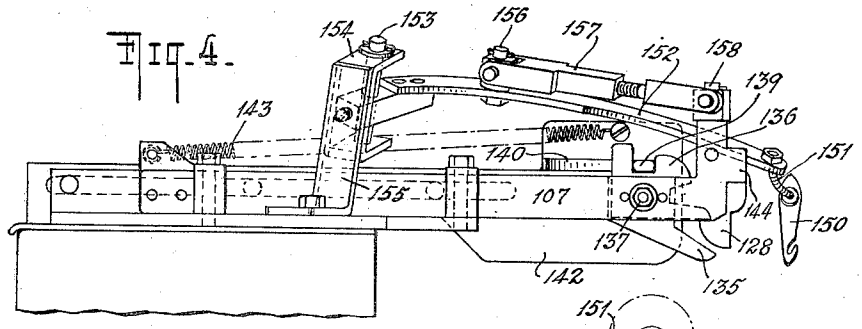
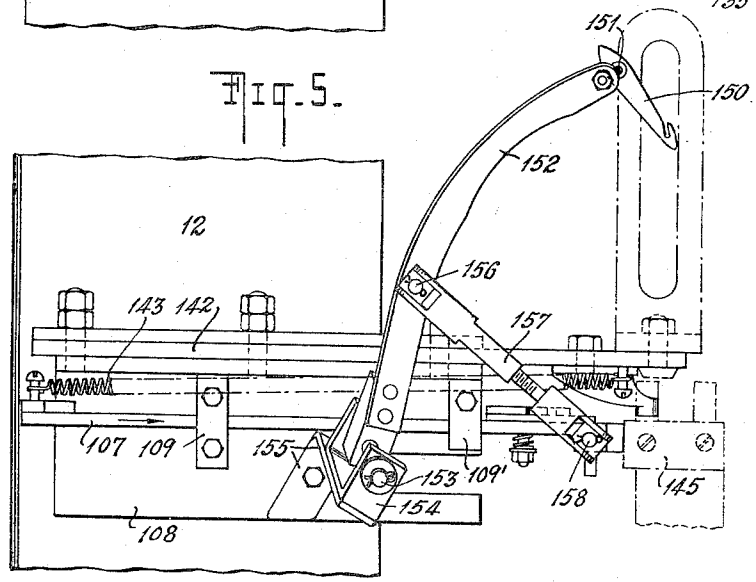


FIG. 5.



INVENTORS
EMIL R. PEDRAZZO
ADONE R. PEDRAZZO
BY
Briesen & Schrenk,
ATTORNEYS

May 1, 1945. A. R. PEDRAZZO ET AL 2,374,951

LOOM

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FIG. 6.

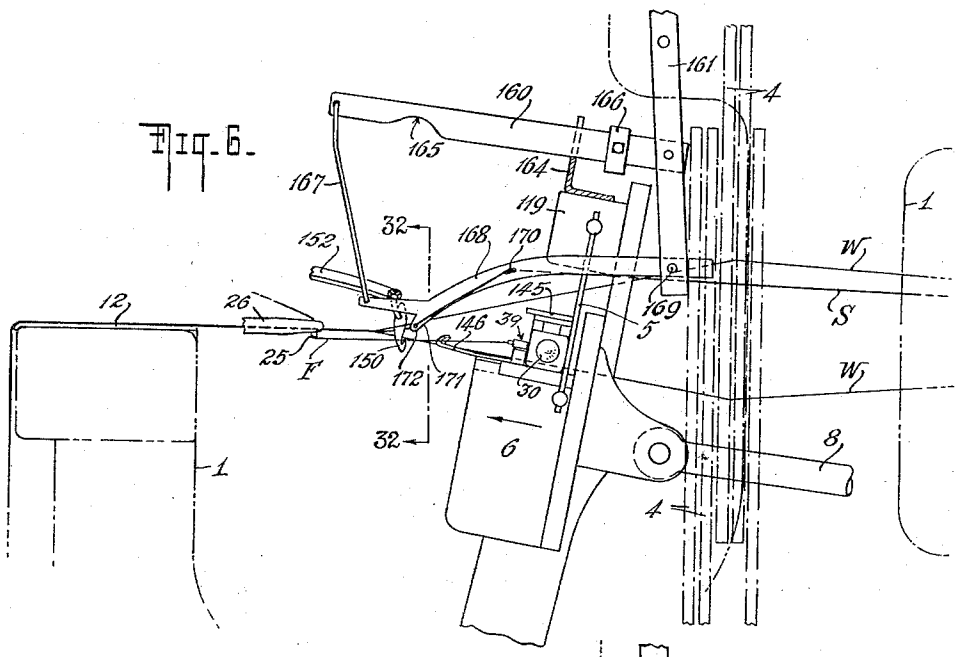
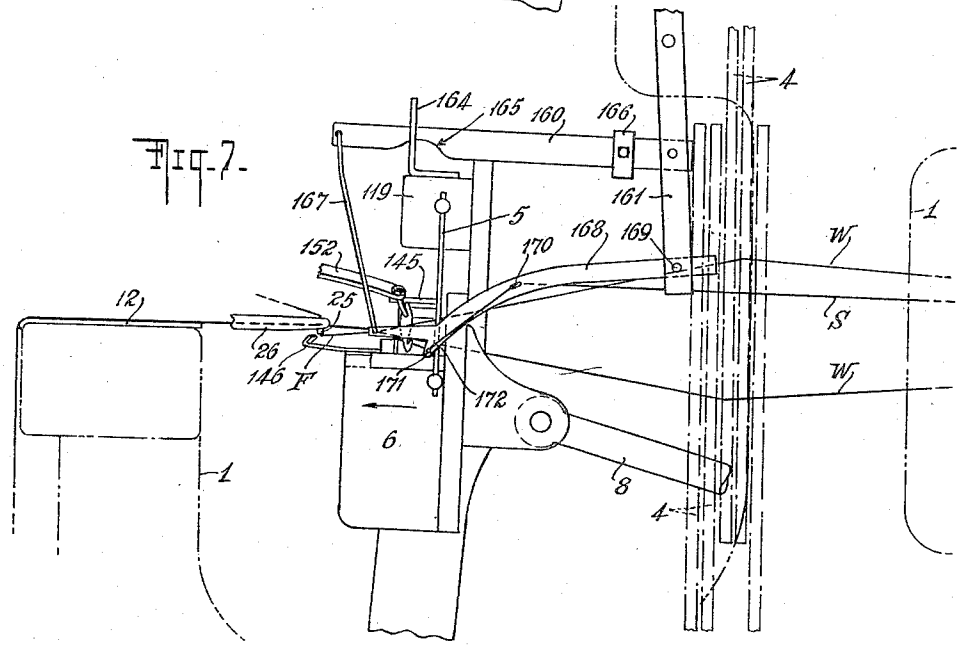


FIG. 7.

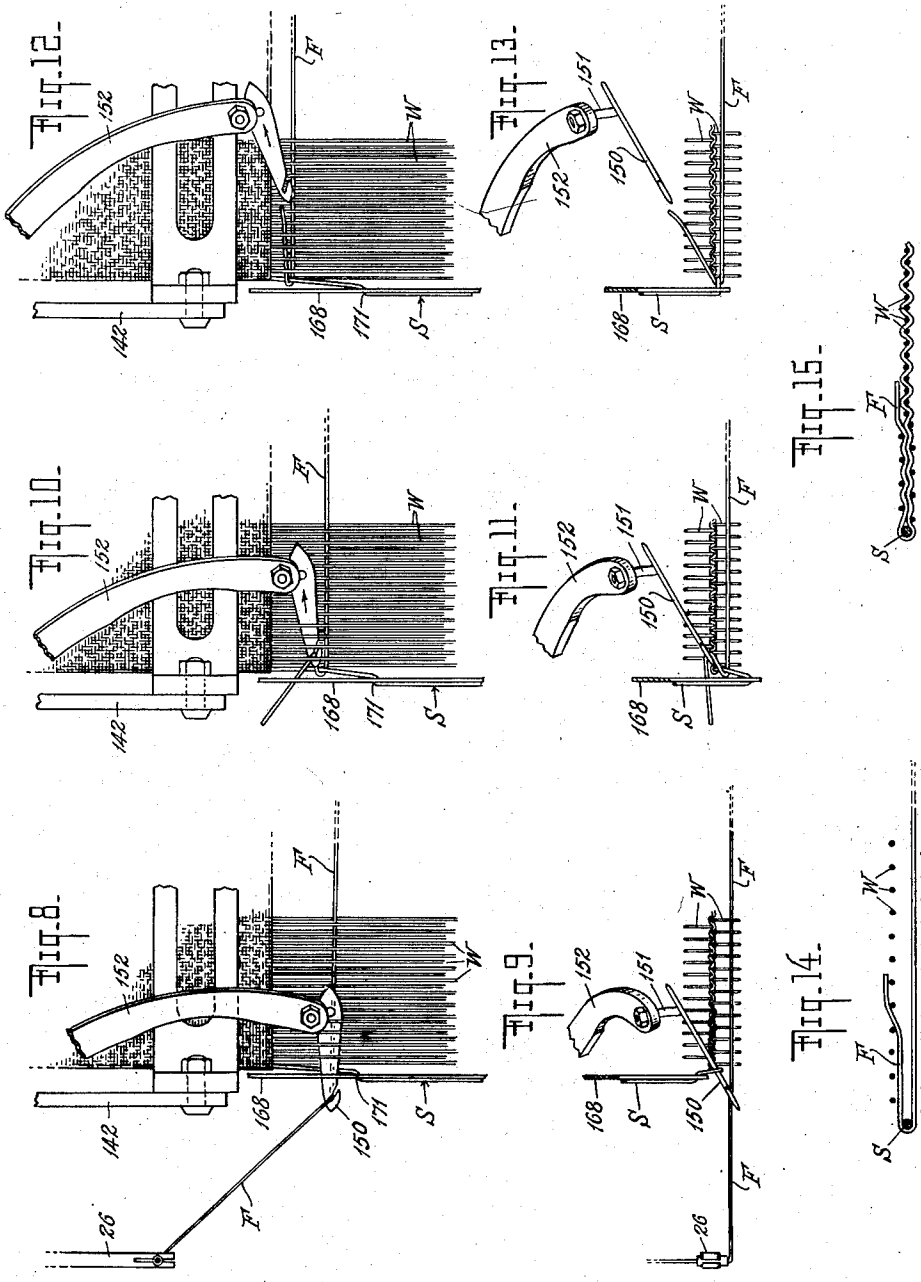


INVENTORS
EMIL R. PEDRAZZO
ADONE R. PEDRAZZO
BY
Briesen & Schurck,
ATTORNEYS

May 1, 1945. A. R. PEDRAZZO ET AL 2,374,951

LOOM

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INVENTORS
EMIL R. PEDRAZZO
ADONE R. PEDRAZZO
BY
Briesen & Ahrens,
ATTORNEYS

Patented May 1, 1945 2,374,951

UNITED STATES PATENT OFFICE

2,374,951

LOOM

Adone R. Pedrazzo, Union City, and Emil R. Pedrazzo, West New York, N. J., assignors to Botany Worsted Mills, Passaic, N. J., a corporation of New Jersey

Original application November 7, 1939, Serial No. 303,178, now Patent No. 2,265,190, dated December 9, 1941. Divided and this application October 30, 1941, Serial No. 417,084

7 Claims. (Cl. 139—126)

This invention relates to improvements in looms of the type in which the thread for the weft or filling is fed from cones or bobbins on each side of the loom to a shuttle which merely acts as a carrier to draw the filling threads through the shed. This application is a division of our copending application Serial No. 303,178, filed November 7, 1939, now Patent No. 2,265,190.

The principal object of the invention is to provide an improved loom of the character indicated which will be simple and durable in construction and efficient and reliable in its operations.

In accordance with the above and other objects, which will hereafter become more apparent, this invention provides an improved selvaging mechanism which is arranged so as to be automatically controlled by mechanisms associated with the lay of the loom and which is of a simple and practical nature and designed to more efficiently carry out the functions of a loom of the character indicated.

The invention is illustrated in the accompanying drawings, in which Fig. 1 is a right-hand side elevation of the entire machine; Fig. 2 is a plan view on an enlarged scale of the right-hand portion of the loom; Fig. 3 is a detailed plan view of the filler selvage hook mechanism in its normal position; Fig. 4 is a side view of the mechanism illustrated in Fig. 3; Fig. 5 is a detailed plan view, similar to Fig. 3, but showing the filler selvage hook at the end of its movement under the action of the lay; Fig. 6 is a diagrammatical side view illustrating the positions of the selvaging control mechanism at the start of the forward movement of the lay; Fig. 7 is a similar view illustrating the positions of the selvaging control mechanism at the half of the forward movement of the lay with the selvage thread brought into lower position, in position for the ends of the filler or weft thread to be interwoven through the shed and around the selvage thread; Fig. 8 is a detailed top plan view of the right-hand end of the warp showing the selvage control arm in the position illustrated in Fig. 6, with the selvage forming hook thereof disposed between the upper and lower separated warp threads and in engagement with the filling thread, the thread being shown as still connected to the needle and the mechanism intermediate such hook and needle being omitted for the sake of clearness; Fig. 9 is a view of the parts shown in Fig. 8 taken from the rear of the shed along the line 32—32 of Fig. 6; Fig. 10 is a view similar to Fig. 8 illustrating the action of the selvage forming hook as it is being withdrawn through the upper warp threads of the shed; Fig. 11 is a view similar to Fig. 9 illustrating the position of the parts shown in Fig. 10; Fig. 12 is a view similar to Figs. 8 and 10 and shows the selvage forming hook after it has completed its movement through the upper warp threads of the shed; Fig. 13 is a view similar to Figs. 9 and 11 illustrating in another view the positions of the parts shown in Fig. 12; Fig. 14 is an enlarged detailed section showing the end of the filling thread in its fully drawn condition with the upper and lower warp threads separated; Fig. 15 is a sectional view of a portion of the completely woven cloth illustrating the manner in which the selvage end of the filling thread is locked in position and Fig. 16 is a top plan view of the shuttle with the filler thread carriage in position to receive the thread at the right-hand end portion of the machine, the carriage being shown in dotted outline at the position it will be on the shuttle for receiving the filler thread at the left-hand side of the loom.

In order that the construction and operation of the mechanisms illustrated in the accompanying drawings may be more readily understood, it should be kept in mind that the shuttle used in this loom is of the pirnless type in that it carries no thread supplying quills or cops. The shuttle merely acts as a carrier for the weft or filling thread which is fed to the shuttle at one end of the loom and is detached therefrom when the shuttle reaches the other end of the loom at the end of its throw. Associated with the shuttle boxes at each end of the loom are mechanisms for bringing the shuttle into proper position to be loaded, for locking the shuttle in loading position, for feeding and discharging the ends of filling threads from the shuttle, for cutting filling threads to their proper lengths and forming the ends thereof into a selvage, for releasing the various latching and locking mechanisms and for actuating the shuttle. The corresponding mechanisms on each side of the loom are similar in all respects except for certain details. In view of the similarity of the mechanisms on each side of the loom and the fact that a description of those on one side of the loom will suffice for an understanding of the operation of those on both sides, a detailed description of the mechanisms at the right-hand side of the loom only will be given, it being understood that such description applies in all respects to the mechanisms at the other side of the loom.

Turning now to the drawings, it may be first pointed out generally that the body of the loom is of usual construction and includes side frame members 1 which are connected by cross mem-

bers in the customary fashion. The warp threads W are fed from a spool 2 at the rear of the loom forwardly over a roller 3 and then through heddle frames 4 and a reed 5 of any desired construction. The heddles 4 may be arranged in any manner to open the warp and to form the shed in the usual way and the reed 5 is oscillated in the usual manner to pack the filling thread F after the latter has been fed through the shed. The oscillatory movement of the reed 5 is about the pivotal axis of the lay 6 on the upper end of the latter of which the reed is mounted, the lower end of the lay 6 being connected in the usual manner to a transverse shaft 7 which is supported at its ends by the side frame members 1 of the loom. As is usual, the lay 6 is pivoted about the shaft 7 as an axis by means of a crank arm 8 which is pivotally connected at one end to the rear of the lay and at its other end is connected to a crank 9 fixedly attached to a crank shaft 10 extending transversely of the loom. The crank shaft 10 and the crank 9 are rotated in a clockwise direction, as viewed in Fig. 1 of the drawings, and when the crank 9 is in the position designated A, the lay has been advanced to its forward or closed position while, when the crank 9 is in the position designated B in the position shown in Fig. 1, the lay has been withdrawn to its rearmost or fully retracted position. Disposed on each side of the series of warp threads W is a selvage thread S which is fed from a tensioned spool 11 at the rear of the loom forwardly over the roller 3, through the heddle frames 4 and reed 5 and through a pair of eyes provided on a forwardly extending guide arm, as will be hereinafter more fully explained. The woven material formed from the warp threads W, selvage threads S and filling threads F, feeds forwardly over the templet 12 provided on a cross-beam of the loom, then passes downwardly from such templet and is wound up on a roller 13 supported by the side frame members 1 at the front of the loom. As the parts so far described form no part of the present invention, details thereof have not been illustrated.

On each side of the loom beyond the series of warp threads is provided a suitable spool or cone 14 on which is wound the filling or weft threads F (see Figs. 1 and 2). Each of the cones 14 is disposed in a suitable container 15 which is preferably made of transparent material and is mounted on a bracket 16 fixedly attached to the adjacent side frame member 1 of the loom. As is shown in Figs. 1 and 2, the filling thread F from each spool 14 is drawn upwardly through an eye 17 provided at one end of a channel-shaped guide member 18 which is secured at such end to the cover of the container 15 and projects transversely and forwardly of the loom into association with the operating mechanisms at such end of the loom. The filling thread F passes from the eye 17 through the channel of the guide member 18 to an eye 19 provided at the other or outer end of such guide member and then downwardly from such eye 19 around a rod 20 which is attached at its upper end to the outer end of the channel member 18. During the passage of the filling thread F through the channel member 18, it is maintained in frictional engagement with the bottom wall of such member, which is preferably lined with felt, by a plurality of tension members 21, 21 (see Fig. 2) which function to yieldably retard the feed of the filling thread from the spool 14 to the rod 20. The filling thread F is fed down the vertically disposed rod 20 in a spiral manner (see Fig. 1) and at the lower end of such rod is passed through an eye 22 provided on the outer end of a bracket arm 23 to which is also connected the lower end of the rod 20. From the eye 22 the filling thread passes through a ring or eye provided on the lower offset end of a member 24 and thence through an eye 25 provided on the outer or free end of a needle 26 (see Figs. 1, 6 and 7). The bracket arm 23 is fixedly secured at its forward end to a bracket plate 27 mounted on the templet 12. Secured to the bracket arm 23, intermediate its ends, is a vertically disposed bearing plate to the upper end of which is pivotally connected the member 24 which depends therefrom. The member 24 functions in the nature of a pendulum, being normally in the position shown in Fig. 1, but swinging toward the right, as viewed in such figure, when tension is exerted on the filling thread. The oscillating movement of the member 24 is limited by adjustable stop members provided on the bracket 23 on each side of such member. It will thus be seen that the filling thread F during its feed from the spool or cone 14 is restricted against free movement by its engagement with the felt lining in the channel member 18 under the influence of tension members 21, 21, the frictional engagement of such thread with the exterior surfaces of the rod 20 around which it is spirally fed, and the inertia of the pendulum member 24. Although exerting a restraining influence on the feed of the filling thread, the pendulum member 24 by reason of its being pivoted can immediately supply a sufficient amount of the filling thread to take up the initial shock imparted thereto when the shuttle is thrown across the loom, thereby preventing breakage of the filling thread during this operation. When the filling thread is cut at the end of the throw of the shuttle, the weight of the pendulum member 24 enables it to return to its normal position, thereby retracting the cut end of the thread so that only a small portion of it dangles from the eye 25 of the needle 26.

The shuttle or carrier to which the filling thread F is fed by the needle 26 is illustrated and described in detail in the aforementioned copending parent application. For the purposes of this application, however, it is believed only necessary to state that the shuttle or carrier, which is designated generally by the numeral 30, comprises a longitudinally extending channel member which slidably carries a filling thread carriage that is designated generally by the reference character 39 (see Figs. 6 and 16). The carriage 39 is adapted for sliding movement on the channel member lengthwise of the shuttle during the throw of the shuttle while, when the shuttle is at rest in a shuttle box, the carriage is at either end of the shuttle. Assuming, for instance, that the shuttle is positioned in the right-hand box of the loom, as viewed in Fig. 2, then the carriage is on the left-hand side of the shuttle, as is shown in full lines in Fig. 16 of the drawings. When the picker at the right-hand side of the loom is actuated to impart to the shuttle a blow sufficient to drive it across the lay 6 of the loom, the carriage 39 by reason of its inertia and its slidable connection with the shuttle does not instantly partake of the sudden movement of the latter to the left but moves relative to the shuttle to the dotted line position shown in Fig. 16 of the drawings, in which position it is held during the passage of the shuttle across the loom. By this method the carriage 39 is brought to a trailing posi-

tion at the back of the shuttle **30**, leaving the pointed end of the latter free as in ordinary shuttles. As is shown more clearly in Fig. 16, the body of the carriage is provided with a pair of forwardly projecting end members **43** and **44** between which are positioned a pair of slidably mounted spring pressed plates or latch members **48** and **53**, each of which is normally urged lengthwise of the shuttle towards one of the end members **43** and **44** by means of the spring **55**. The latch members are shown in their fully advanced positions under the influence of spring **55** in Fig. **16** of the drawings. Each set of end and latch members, namely, the end and latch members **43** and **48** and the end and latch members **44** and **53**, are adapted to hold the end of a filler thread therebetween during the travels of the shuttle across the lay. Associated with both shuttle boxes are means for inserting the end of a filler thread between the set of end and latch members on the carriage which will be in a trailing position during the travel of the shuttle across the loom. When the shuttle reaches a shuttle box after its throw across the lay, means are provided to release the end of the filling thread held by the trailing latch member and end member and at the same time to secure the loose end of a new filling thread from the spool or cone **12** disposed on such side of the loom, between the other slidable plate or latch member and its associated end member on the shuttle carriage.

The means for releasing the filling thread F carried across the loom by the carriage **39** of the shuttle **30** consists of a releasing plate **128** (see Fig. 1) which is mounted on the forward end of a rearwardly extending arm **107** (see Figs. 3 to 5). The arm is slidingly supported by guides **109**, **109'** provided on a bracket plate **108** secured to the templet **12** and the underlying cross-beam of the loom (see Figs. 3 to 5). As the lay in its forward motion with the shuttle **30** and the carriage **39** thereof correctly positioned in its box, brings the carriage **39** up to the releasing plate **128**, the latter will engage the carriage latch member holding the end of the thread and force such member aside against the tension of spring **55**, thereby releasing the fastened end of the filling thread F from the engagement of such member and its associated end member.

Immediately following the engagement of the releasing plate **128** with the said latch member of the carriage **39**, the lower projecting end of the eye **25** provided on the outer end of the needle **26** will come into engagement with the other latch member of the carriage and open such member against the tension of spring **55**. The needle **26** is pivotally mounted at its forward end on an extension of the bracket plate **108** which is secured to the templet **12** and the underlying cross-beam of the loom, such pivotal connection being loose to enable a slight sidewise movement of the outer end of the needle **26**. The arrangement of the needle **26** is such that the eye **25** of the needle first comes into engagement with an inclined surface of the latch member at a point spaced from its associated end member. As the lay continues its forward movement, the looseness provided at the pivotal point of the needle will enable the eye **25** to be cammed slightly towards the associated end member so that when it has entered between the latch and end members engaged, it will be frictionally engaged by the opposed edges of both members. The needle **26** is then pivoted upwardly by suitable means to lift the eye **25** thereof upwardly out of engagement between the engaged latch and end members of the carriage **39**. As soon as the eye **25** is moved past such members, the latch under the tension of spring **55** will immediately snap to closed position, thereby anchoring the end of the filling thread dangling through the eye **25** to the carriage. As a result of the operations of the releasing plate **128** and the needle **26**, the end of the thread which has been carried across the loom by the shuttle **30** has been released and the end of a new filling thread from the spool **12** on the adjacent side of the loom will have been connected to the carriage **39** of the shuttle **30**, so that when the shuttle is again operated by the picker **70** it will carry across with it the attached end of the new filling thread to the opposite side of the loom.

After a filling thread has been carried across the loom by the shuttle **30**, mechanisms come into operation in the second half of the forward stroke of the lay to cut such thread from the spool from which it has been fed. The mechanism for accomplishing this purpose comprises a stationary blade **135** which is fixedly attached to the sliding arm **107** and a movable blade **136** which is pivotally mounted on a spring pressed bolt **137** (see Figs. 3 and 4). Positioned in a slot in the upper end portion of the blade **136** is an actuating pin **139** which is provided on the outer end of a bracket **140** secured to a stationary supporting arm **142** which is fixedly secured to the bracket plate **108** in any suitable fashion, as by means of bolts. A spring **143** connects the outer end of the arm **142** with the inner end of the slidable member **107** and normally maintains such member in its outermost position with the forward end thereof up against the guide member **109** (see Figs. 3 and 4). In this position of the parts, the blades **135** and **136** are opened. As the lay **6** moves forwardly, a striking plate **145** mounted on the shuttle box (see Fig. 6) engages with a rearwardly projecting portion **144** provided on the slidable member **107** and forces such member forwardly against the tension of the spring **143** (see Fig. 5). As the slidable member **107** is forced forwardly, the fixed pin **139** rotates blade **136** to cut the filling thread adjacent to the associated needle **26**. In the forward movement of the lay a finger **146** mounted on the lay (Fig. 2) over which the thread was drawn during the throw of the shuttle, brings the filling thread into proper position for the cutting operation, while a finger **147** (see Fig. 2) engages the portion of the thread on the other side of the cutting blades to assure a positive cutting thereof. As soon as the filler thread F has been cut, means come into operation to form the ends thereof into a selvage in the manner now to be explained.

The selvage forming mechanism on each side of the loom comprises a filling hook **150** which is connected by means of a bent pin **151** to the outer end of a curved swivel arm **152**. The inner end of the swivel arm **152** is connected to a pin **153** rotatably supported between the arms of a U-shaped bracket member **154**. The swinging arm **152** may be adjusted vertically by shifting its position relative to the pin **153** and is secured in position on such pin by means of a set screw. The bracket **154** is mounted on the upper end of a bracket arm **155** attached to the upper surface of the bracket plate **108**. The swinging arm **152** is provided intermediate its ends with an upwardly extending pin **156** to which is connected one end of an arm **157**, the other end of the arm **157** being pivotally connected to a pin **158** provided on the outer end of the slidable member

107. It will be seen, therefore, that as the slidable arm member 107 is forced forwardly by the striker plate 145, as is illustrated in Fig. 5, the swinging arm 152 and consequently the filling hook 150 will be rotated about the pin 153, forwardly and upwardly in a counter-clockwise direction, as viewed in Figs. 3 and 5, from the position shown in Fig. 3 to the position shown in Fig. 5. The range of travel of the arm 152 and hook 150 is shown more clearly in Fig. 2 of the drawings, in which figure, the full line position of arm 152 and hook 150 corresponds to the position illustrated in Fig. 3, while the dotted line postion of such parts corresponds to the position illustrated in Fig. 5 of the drawings. When the lay is returning to its retracted position the swinging arm 152 and consequently the hook 150 will, under the action of the spring 143 on the slidable member 107, move in a clockwise direction from the position shown in Fig. 5 to the position shown in Fig. 3. Due to the fact that the arm 152 moves along a curved path in its movements, the connections at the ends of the arm 157 are universal connections. During the movement of the swinging arm 152 and the hook 150 from their retracted position, as shown in Fig. 5, to their advanced position, as shown in Fig. 3, the hook 150 passes through the warp threads of the upper shed at the end adjacent to such hook. A better understanding of this movement of the hook 150 may be had by comparing Figs. 8 to 13 of the drawings. Assuming that the movement of the hook 150 is the opposite to that illustrated in such figures, it will be seen that as the hook advances, it moves from the position illustrated in Figs. 12 and 13, through the upper shed between the fourth and fifth end warp threads W, as is illustrated in Figs. 10 and 11, to a position where it projects beyond the selvage thread S, as is shown in Figs. 8 and 9. At the end of its forward movement, the position illustrated in Fig. 3, the hook 150 projects beyond the end warp thread W and the selvage thread S in a position slightly advanced from that illustrated in Figs. 8 and 9 of the drawings. During this movement of the hook 150 the selvage thread, which is normally in a position adjacent to the warp threads of the upper shed, is depressed to enable the end of the hook 150 to pass over such thread.

The mechanism for depressing the selvage thread S comprises a cam arm 160 (see Figs. 1 and 2) extending transversely above the lay and pivotally attached at its rear end to a supporting bar 161 which is fixedly secured in position on the loom by means of a bracing rod 162 connected at one end to the side frame 1 of the machine and at its other end to the bar 161. The upper end of the bar 161 is connected in any suitable manner to the cross channel beam 163 of the loom. The cam arm 160 rides in a slot provided in a guide member 164 which is mounted on the cross-beam 119 of the lay and which moves relative to such arm in the movements of the lay, as is shown more clearly in Figs. 6 and 7 of the drawings. Adjacent to its outer or forward end the cam arm 160 is provided on its under surface with a cam surface 165 which enables the cam arm to be depressed when the guide member 164 is in engagement with such cam surface. Mounted on the cam arm 160 intermediate the guide member 164 and the supporting bar 161, is an adjustable weight 166 which maintains the lower edge of the cam arm in engagement with the bottom of the slot in the guide member 164. The outer end of the cam arm 160 is connected by means of a link 167 to the outer end of an arm 168 which at its inner end is pivoted at the point 169 to the supporting bar 161. As will be clearly seen from Figs. 6 and 7 of the drawings, the arm 168 is provided intermediate its ends with an eye 170 and adjacent its outer end, on a downwardly projecting extension 171 thereof, with an eye 172 through which eyes the selvage thread S extends. It will be seen that as the lay moves forwardly from its rear position, as illustrated in Fig. 6, the cam arm 160 and the arm 168 are in their raised positions so that the selvage thread S is positioned adjacent to the warp threads forming the upper layer of the shed. As the lay moves forwardly into the region of the cam surface 165, the cam arm 160 under the influence of the weight 166 and the arm 168 will be lowered, thereby causing the eye 172 to depress the selvage thread S, as is shown in Fig. 7. On continuation of the forward movement of the lay, the guide member 164 will again raise the arms 160 and 168, thereby raising the selvage thread. On the return movement of the lay, the reverse of these operations will take place. As the hook 150 is moving into position between the threads of the upper layer of warp threads of the shed in the region between the extension 171 of the arm 168 and the woven material, at the time that the guide member 164 is in engagement with the cam surface 165 on the return movement of the lay, the hook 150 is enabled to pass over such depressed portion of the selvage thread. On continued rearward movement of the lay, the selvage thread S will be lifted to bring it into engagement against the under surfaces of the hook 150, as is illustrated in Figs. 8 and 9 of the drawings. On the next forward stroke of the lay, the end of the hook 150 will engage with the portion of the thread extending from the needle to the shuttle which has been thrown across the loom, as is illustrated in Figs. 8 and 9. As the lay continues its forward movement to bring the cutting mechanism into operation, as has been previously explained, the cut thread is drawn by the hook 150 between the upper and lower layers of warp threads in the shed. At this time the lay in its forward motion brings the guide member 164 into the region of the cam surface 165 so that the selvage thread is again lowered, thereby tensioning the selvage thread against the pull exerted on the filler thread by the hook 150, such condition of the parts being illustrated in Figs. 10 and 11 of the drawings. As the lay completes its forward movement, the hook 150 is brought out from beneath the shed of the warp threads, leaving the end of the filling thread on the warp threads of the upper shed, as is illustrated in Figs. 12 and 13 of the drawings. The final position of the selvage end of the filling thread with respect to the selvage thread and the warp threads is illustrated in Fig. 14 of the drawings. When the shed is reversed the several threads will be in the positions shown in Fig. 15 of the drawings, the reed having pushed the filling thread into close engagement with the other threads of the finished product.

From the foregoing it will be understood that the several instrumentalities perform their operations during the last half of the forward movement of the lay 6 or while the crank arm 9 is moving from the position designated D to the position designated A in Fig. 1 of the drawings. When the crank arm 9 is in the position designated A, the lay is in its extreme forward posi-

tion and the shed is closed. In this position of the lay, the shuttle **30** is positioned in one of the shuttle boxes. Assuming that the shuttle is in the right-hand shuttle box, on the right-hand side of the loom, as viewed in Fig. 2, the rear end of the needle **26** is above the shuttle carriage **39** with the end of the filler thread dangling therefrom caught between one of the latch members and its associated end member of the carriage. The slide arm **107** is being held in its fully retracted position by the striker plate **145** so that the movable blade **136** of the filling thread cutter is fully closed. On the left-hand side of the loom the corresponding mechanisms are similarly disposed. Both the selvage forming ends of the filling thread last carried by the shuttle have been drawn through the outer warp threads so that they are interlocked with the latter and the reed **5** has moved such interlocked thread up against the finished material.

As the crank arm **9** moves from the position A to the position C during the rotating movements of the crank shaft **10**, the lay **6** moves rearwardly and the harness **4** opens the shed. During this period of movement of the lay, the shuttle remains at rest in the shuttle box at the right-hand side of the loom. The slide arm **107**, however, moves rearwardly with the lay under the influence of spring **143** and during such movement causes the selvage hook **150** to swing rearwardly and downwardly so that it enters between the fourth and fifth warp threads of the upper shed, as has been explained. The hook **150** enters between the threads just about the time that the cam surface **165** of the arm **160** has been brought into engagement with the guide member **164** so that the selvage thread S is momentarily depressed to enable the selvage hook **150** to pass over it. During this rearward movement of the slide arm **107**, the movable blade **136** of the filler thread cutter is returned to its open position by the pin **139** (see Fig. 5). At the end of the rearward movement of the slide arm **107** and while the lay is continuing its rearward movement, the needle **26** returns to its normal position, leaving the end of the filling thread in the carriage. The corresponding mechanisms on the left-hand side of the machine go through similar operations to place such mechanisms in a condition to be operated on the next forward movement of the lay.

When the crank arm **9** reaches the position indicated C in Fig. 1 of the drawings, the picker **70** is actuated to strike the shuttle **30**, the latter being thrown as a result of such impact, across the loom. The period of time in which the shuttle moves from one shuttle box to the other being the period that the crank arm takes to move from the position designated C through the position designated B, to the position designated D, or during the time that the lay has been retracted to its fully opened position and has advanced halfway back to its closed position. As the shuttle moves from the shuttle box at the right-hand side of the loom under the impact of the picker **70**, the carriage **39** on such shuttle, by reason of its inertia, moves backwardly with relation to the shuttle to the rear end of the latter to a trailing position. As the shuttle leaves the shuttle box, the filler thread is caught by the guide finger **146** which holds the thread to the lay as the latter continues its rearward motion so that the thread during the passage of the shuttle is held in a position substantially, but not quite, parallel with the front end of the top surfaces of the lay. The pendulum member **24** during such passage of the shuttle **30** is swung rearwardly so that there is a gentle forward pull on the filling thread to maintain it in proper position relative to the warp threads of the shed.

As the crank arm **9** moves from the position D to the position A, the releasing plate on the slidable arm **107** at the left-hand side of the loom comes into engagement with the latch member on the carriage **39** which holds the thread, to release the latter. The released end of the thread drops across the selvage hook **150** which is now positioned below such carriage, in position to enable the hooked end of the hook **150** to catch and to pull such loose end through the end warp threads at the left-hand side of the shed to form the selvage. The striker plates **145** then engage with the projecting portions **144** of the slidable arms **107** to move the latter forwardly and thereby to rotate the movable blades **136** of the cutters to their closed position. As the thread in this position of the parts is connected to the right-hand needle **26**, the cutter **136** at the right-hand side of the loom only will perform an actual cutting operation. At the same time the finger **147** at the right-hand side of the loom engages the thread to tension the portion of the filler thread between the blades of the cutter and enable the latter to perform their function properly. As the slides **107** are moved forwardly, the selvage hooks **150** are also moved from their lowermost positions into engagement with the ends of the filler thread, as shown in Figs. 8 and 9, to bring the latter up through the warp threads of the upper shed, as has been explained. As the loom completes its movement, the reed **5** packs the filling thread against the body of the woven fabric. The parts are then again in position to begin their cycle of movements as the lay moves rearwardly on its next backward stroke.

Having thus described and illustrated a loom embodying the present invention, it will be obvious to those skilled in the art that changes in the form, construction and arrangement of the several cooperating mechanisms may be resorted to without departing from the spirit and scope of the invention and hence we do not wish to limit ourselves strictly to the structures herein set forth.

We claim:

1. In a loom, a shuttle provided with a filling thread carriage, a shuttle box, a fixed portion of said loom, an arm slidably mounted on said fixed portion of the loom, a releasing plate carried by said arm and constructed and arranged to engage with the carriage of said shuttle to release a thread carried thereby, a hook pivotally connected to said fixed portion of the loom, an actuating arm connected at one end to said slidable arm and to said hook, said actuating arm on movement of said slidable arm being constructed and arranged to advance said hook through the warp threads of the upper shed into position to receive the released end of the filler thread and to withdraw said hook to draw the released end of the filler thread carried thereby through the upper warp threads of the shed and means connected to said shuttle box for moving said slidable arm in the operation of the loom.

2. In a loom, a shuttle provided with a filling thread carriage, a shuttle box, a fixed portion of the loom, means carried by such portion for releasing a thread carried by said carriage, pivoted means carried by such portion constructed and arranged to move rearwardly and downwardly between the end threads of the upper shed, means

connected to said shuttle box for actuating said thread releasing means and pivoted means in the operation of the loom, and guide means for a selvage thread arranged to be depressed during the rearward movement of said pivoted means and constructed and arranged to depress such selvage thread a sufficient amount to enable said pivoted means to pass thereover.

3. In a loom, a hook pivotally connected to a fixed portion of the loom and constructed and arranged to move from a retracted position through the warp threads of the shed into an advanced position to receive an end of a filler thread, means slidably mounted on said loom, means connecting said hook and said slidable means and constructed and arranged on movement of the latter to actuate said hook, means normally urging said slidable means in a direction to maintain said hook in advanced position and means mounted on a movable portion of said loom and constructed and arranged to periodically move said slidable means in the operation of the loom against the pressure of said last-mentioned means in a direction to retract said hook and thereby to draw the end of a filler thread carried by the latter through the shed.

4. In a loom, movable means pivotally connected to a fixed portion of the loom and including a pivotal arm and a hook movably mounted on such arm, said arm and hook being constructed and arranged to move from a retracted position to insert said hook through the warp threads of the shed into position to receive an end of a filler thread, means slidably mounted on said loom, means connecting said pivotal arm with said slidable means and constructed and arranged upon movement of the latter to actuate said pivotal arm and said hook, spring means connected to said slidable means and normally urging the latter in a direction to maintain said arm and hook in advanced position, and means mounted on a movable portion of said loom and constructed and arranged to periodically move said slidable means in the operation of the loom against the pressure of said spring means in a direction to retract said hook and thereby to draw the end of a filler thread carried by the latter through the shed.

5. In a loom, movable means constructed and arranged to move rearwardly and downwardly between the end warp threads of the upper shed, means operable to depress a selvage thread a sufficient amount to enable said movable means to pass thereover during the latter's rearward movement, means operable to drop the end of a filling thread across the portion of said movable means projecting beyond the selvage thread, said projecting portion of said movable means being in the form of a hook and constructed and arranged to draw the end of the filling thread over the selvage thread, under the end threads of the upper shed and through such shed on the return movement of said movable means.

6. In a loom, movable means pivotally mounted on a fixed portion of the loom and carrying a hook, said means being constructed and arranged to move through the upper shed at a point spaced from the end thread thereof and between the upper and lower sheds so that the hook thereof projects beyond the end of such sheds, spring means normally urging said movable means to such position, means operable to depress a selvage thread a sufficient amount to enable the hook of said movable means to pass thereover during the aforesaid movement of such movable means, means operable to drop the end of a filling thread across the projecting portion of the hook, and means on a movable portion of the loom constructed and arranged to periodically cause said movable means to withdraw from between the sheds against the pressure of said spring means, whereby the hook draws the end of the filling thread over the selvage thread, through a portion of the sheds and out through the upper shed.

7. In a loom, pivoted means constructed and arranged to move rearwardly and downwardly between the end warp threads of the upper shed, guide means for a selvage thread arranged to be depressed during the rearward movement of said pivoted means, cam means controlling the movements of said guide means and constructed and arranged to actuate the latter to depress the selvage thread a sufficient amount to enable said pivoted means to pass thereover, means operable to drop the end of a filling thread across the portion of said pivoted means projecting beyond the selvage thread, and means constructed and arranged to actuate said pivoted means to cause the latter to withdraw the end of the filling thread through the upper shed.

ADONE R. PEDRAZZO.
EMIL R. PEDRAZZO.