

No. 859,570.

PATENTED JULY 9, 1907.

F. A. MILLS.
WEFT OR FILLING THREAD HOLDING DEVICE FOR LOOMS.

APPLICATION FILED JAN. 10, 1905.

2 SHEETS—SHEET 1.

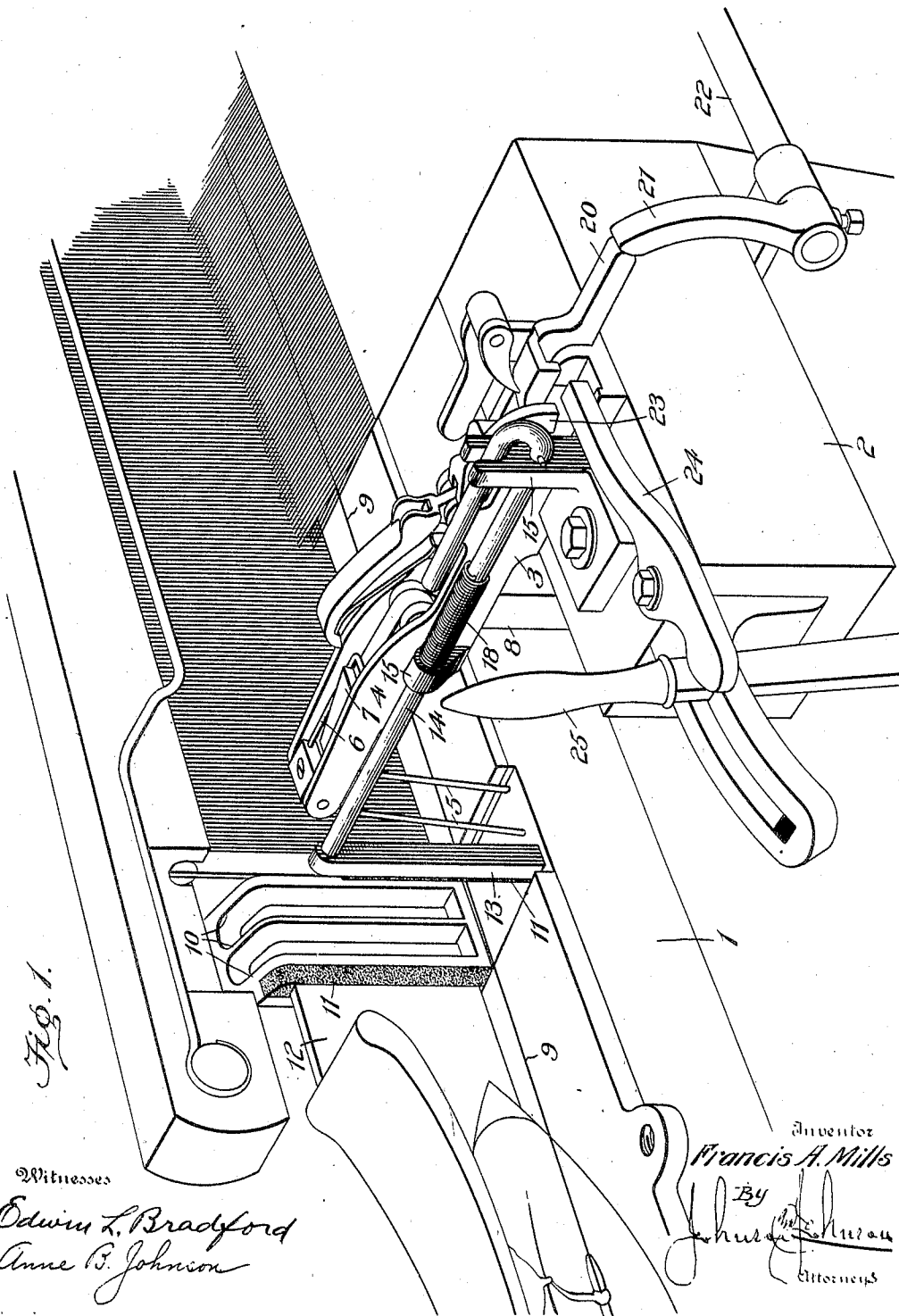


Fig. 1.

Witnesses

Edwin L. Bradford
Anne B. Johnson

Inventor

Francis A. Mills

By

Charles H. Hutton
Attorneys

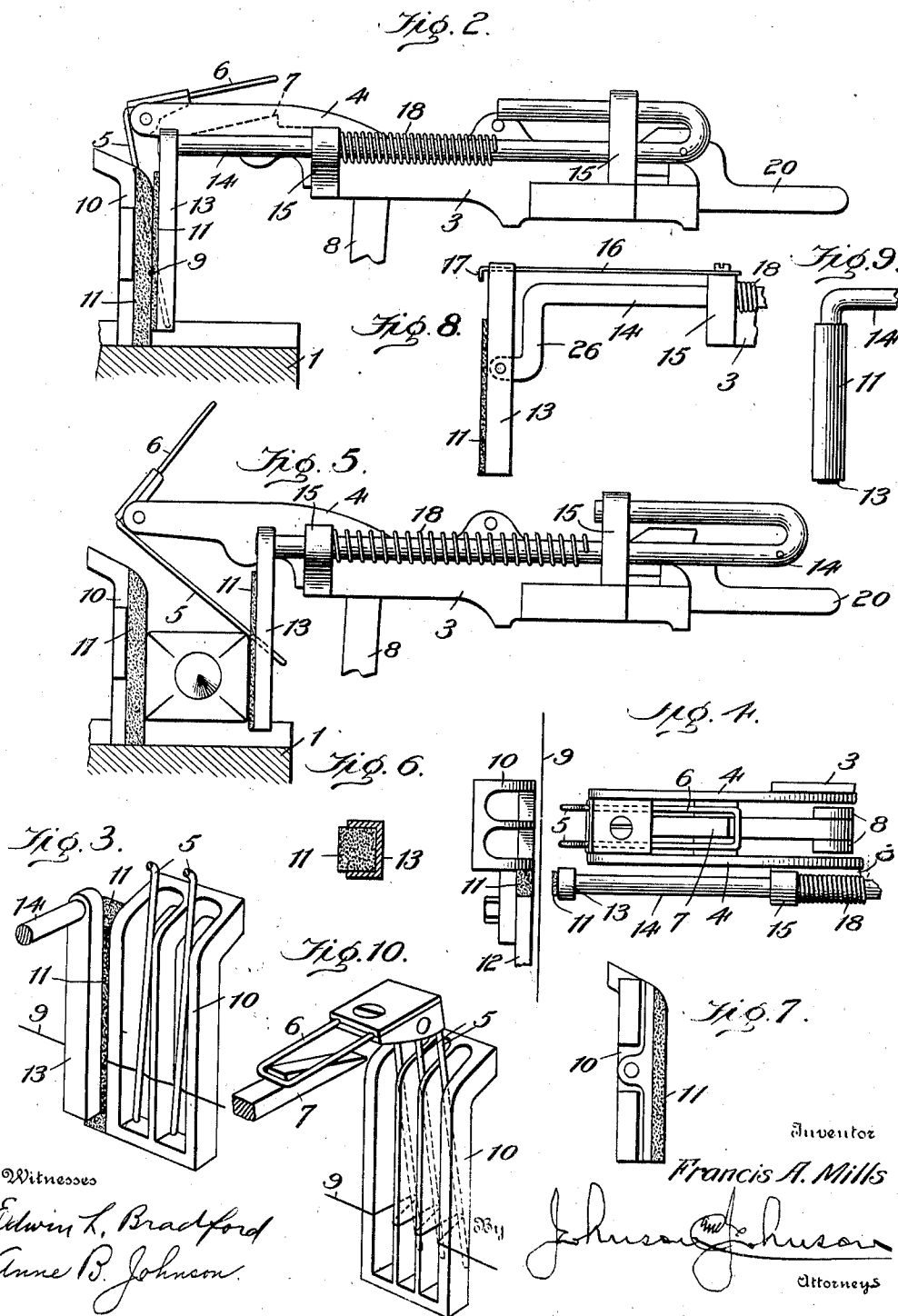
No. 859,570.

PATENTED JULY 9, 1907.

F. A. MILLS.
WEFT OR FILLING THREAD HOLDING DEVICE FOR LOOMS.

APPLICATION FILED JAN. 10, 1906.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

FRANCIS ARTHUR MILLS, OF LAWRENCE, MASSACHUSETTS.

WEFT OR FILLING THREAD HOLDING DEVICE FOR LOOMS.

No. 859,570.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed January 10, 1905. Serial No. 240,464.

To all whom it may concern:

Be it known that I, FRANCIS ARTHUR MILLS, a citizen of the United States, residing at Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Weft or Filling Thread Holding Devices for Looms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention which forms the subject of this patent is directed to means to prevent the forcing of the weft or filling thread through the grid by the weft or filling fork in the operation of a loom, and for this purpose my said invention comprises a slidable instrument actuated by the movement of the lay and having the function of and forming a member of a clamp, the co-acting member of which is carried by the lay, whereby in the operation of weaving the weft or filling thread is seized and held between the said clamping members so that it cannot be drawn from the shuttle toward the grid and forced through it, and by which that portion of the weft or filling thread which crosses the grid between said clamping members and the shed, will be maintained taut insuring thereby the uninterrupted tilting of the weft fork in maintaining its function effective and certain.

The following description read in connection with the accompanying drawings will enable any person skilled in the art to which my invention relates to understand and to practice my invention in the form in which I prefer to employ it; but it will be understood that my invention is **not** limited to the precise form and details of construction herein illustrated and described, as the same may be changed or modified in various particulars without departing from the spirit of my invention and the scope of the claims.

Referring to these drawings:—Figure 1 shows in perspective the left hand portion of the lay and the breast-beam of a loom embodying my invention in a preferable construction, the weft-thread holding parts being in the positions they occupy before their function of holding the weft-thread is rendered operative. Fig. 2 shows in side elevation the co-acting parts of the device in their positions clamping or holding the weft-thread. Fig. 3 shows in perspective the co-acting parts in the positions they occupy in Fig. 2 when holding or clamping the weft or filling thread to prevent it from being forced through the weft or filling grid by the weft or filling fork. Fig. 4 shows in top view the weft-grid, the weft fork and my weft or filling thread holding device, in the positions they occupy just before the operation of clamping to hold the weft-thread to prevent the weft or filling

fork from forcing the weft or filling thread through the weft or filling grid, and in advance of the weft fork tines contacting with the weft-thread. Fig. 5 shows in side view the weft or filling grid, the weft or filling fork, and the weft or filling thread holding device in the positions they occupy when the shuttle stops in the path of the said devices. Fig. 6 shows in cross section the weft or filling thread holding arm and its yielding face. Fig. 7 shows in side view a form of construction of the weft or filling thread holding clamp member fulcrumed or pivoted on the lay. Fig. 8 shows the modified weft or filling thread holder as pivotally mounted or fulcrumed on the slide bar. Fig. 9 shows a modified construction of the cushioned weft or filling thread holder of the slide-bar. Fig. 10 shows in perspective a well known weft or filling grid and filling fork showing the weft or filling thread forced through the weft grid by the weft or filling fork which the purpose of my invention is to prevent.

Referring to Fig. 1, the lay 1, the breast-beam 2, having the fixed bracket or slide-way 3, for the weft or filling fork-slide 4, the weft or filling fork tines 5, pivotally mounted on said slide and having a loop 6, to co-operate with the usual latch or pusher 7, of the actuator 8, when the fork is not operated by the weft or filling thread 9, as in the case when there is no filling or weft thread crossing the path of the grid 10, or when the weft-thread is forced through said grid by said fork as in Fig. 10, together with the shuttle and other well known parts shown in Fig. 1, may be of the usual construction and operate in substantially the same manner, to either cause the stoppage of the loom, or to cause the transfer of a fresh supply of filling in automatic or magazine looms. The shuttle is indicated at *x*.

In the construction shown in Fig. 10 it very often happens that the weft or filling fork forces the weft or filling thread through the weft or filling grid which will defeat the tilting of the weft or filling fork and the result will cause the weft-fork-slide pusher to engage and hold the loop of the weft or filling fork as in Fig. 10; and the result following this operation will be that the loom will be either caused to stop or a fresh supply of filling automatically transferred from a magazine or hopper into the shuttle to be picked through the shed to the opposite shuttle-box.

The primary object of my invention is to prevent the forcing of the weft or filling thread through said grid by said fork; and for this purpose my invention resides in means for seizing and holding the filling thread between clamp-members, whereby it is held so that it cannot be drawn from the shuttle supply under the pressure due to the action or weight in tilting the weft or filling fork by the forward movement of the lay in laying or beating the weft or filling into cloth; and so far as I know

and can find I am the first to devise means in a loom for clamping and holding the filling or weft-thread from being forced through the weft-grid by the weft-fork in the operation of weaving and thereby prevent either the stoppage of the loom or the transfer of filling in automatic looms when such transfer should not occur. The means which I have shown for effecting this object comprises clamping members by which the weft or filling thread 9, is held from movement. One of said members 11, is carried by the lay between the shuttle-box wall 12, and the weft or filling grid 10, and may be of rubber, felt or like substance; or it may be the face of the wall of the shuttle-box next to the grid or it may be the weft or filling-grid, or any part of the lay that will serve as a member of such clamp. The other of said clamp members is preferably a spring pressed arm 13, carried by a slide rod 14, preferably mounted on the weft-fork-slide bracket or race which is fixed to the breast-beam. As shown this arm is supported and adapted to be caused to slide in brackets 15, by the forward movement of the lay and spring pressed toward the lay whereby said arm is caused to engage and hold the weft or filling thread by a clamping function against the member carried by the lay. In this clamping and holding the weft or filling thread it will be understood that said thread which crosses the path of and between said clamping members will be held so as to prevent the weft or filling thread from being drawn by said fork from the shuttle; or from any slack which may occur between the shuttle and said clamping members; while that portion of the weft or filling thread crossing the grid between the said clamping and holding members and the shed, will be held taut and thereby cause the weft fork to be tilted rather than cause the weft-thread to be forced through the weft grid by the weft fork. The important result of this clamping and holding of the weft or filling thread, allows the loom to continue weaving instead of being stopped; and in automatic looms prevents the change of fresh filling when such change should not occur.

I provide means for holding the weft thread between the shuttle and the weft grid to effect an important result. This means consists of the simple construction of a pair of tines 5, 5 made of a single piece of wire bent in the form shown in the drawings and secured by the pivoted clamp block 27, and which I find prevents the tines from becoming loose and the loop pulled away from the tine holder. To suit this pair of fork tines I provide a grid of corresponding bars forming two spaces of considerable distance apart to allow considerable leeway for the fork tines to pass through without striking the grid-bars in which event the weft fork would be thereby tilted and prevent change of filling in automatic weaving and produce what is termed thin places in the cloth; while in other than automatic looms the result would be that the loom would continue running when it should be stopped.

In Figs. 5 and 9 the arm clamping member is shown as being rigid with its spring pressed carrying slide-rod; in Fig. 6 the cushion part being shown as squeezed into a socket; while in Fig. 9 the cushion part is in a tubular form preferably of rubber which is the preferred form. In Fig. 8 the cushioned clamping member is pivotally mounted so as to conform to the angle of the weft or filling thread clamping member on the

lay, and is held at the angle which it is caused to assume by the pressure of a blade-spring 16. In this tilting of the said holder it is limited by the hook end 17 of the blade spring and by the bent end 26, of the spring pressed slide rod. The weft clamping member shown in Fig. 7 may be pivoted to either the weft or filling grid, or to the shuttle-box back wall. Obviously both clamping members may be rigid or both pivoted; or one may be rigid and the other pivoted so as to tilt and this tilting is to allow an even pressure from the top to the bottom of the clamping members to insure the certainty of holding the weft thread irrespective of its position between the clamping surfaces. Looking at Fig. 5 when the shuttle happens to stop in front of the grid and fork, the shuttle will cause the fork tines to be tilted and the armed clamping member to be forced back against the pressure of the spring 18, and the yielding of the cushioned arm, is to prevent damage to the said weft thread holding device or the shuttle.

It will be understood that by my invention the weft-fork will be actuated with certainty and for this purpose I have shown, looking at Fig. 2, how the filling thread is held between the clamping members at 9 and being thus held showing how the weft-fork is caused to be tilted by the impingement of the filling thread against the tines of the fork and the grid.

In the operation of the clamping device it is important to note that the slidable member is in advance of the fork-tines so as to clamp and hold the weft thread in advance of the contact of the fork-tines with the filling thread and thereby cause the clamping and holding of the weft-thread prior to the weft-thread contacting with the weft-fork, so that when the weft-grid presses the weft-thread against the weft-fork, it will be certain to tilt, raising its loop end thereby preventing the hook of the fork slide actuator from engaging said loop of the fork. When the fork loop is caught by the fork-slide actuator in automatic looms it will either cause the transfer of a fresh filling carrier from a magazine into the shuttle; or supply another shuttle with filling or stop the loom. In other than automatic looms this action of the fork-loop caught by the actuator will cause the loom to stop. The pusher end 20 of the fork-slide 4, actuates the arm 21 to rock the rod 22, to cause the operation of transferring a fresh supply of filling from a magazine or hopper to the shuttle. The pusher part 23, operates the lever 24 to disengage the hand lever 25 to stop the loom in a well known manner.

I have shown in Fig. 1 the filling thread 9 as passing from the shuttle in front of the grid and into the material being woven and between these points the means for holding and clamping the weft thread.

Looking at Figs. 1 and 4 it will be noted that the felt 11 is seated in a vertical trough shaped pocket forming a part of and at one side of the grid and that the felt 11, is caused to be compressed by contact therewith of the yielding thread holding device thereby allowing the thread to be clamped into the felt which has the effect of and causes the weft thread to be held taut between the cloth and thread holding device and therefore hold the filling or weft thread taut across the grid-bars so that the fork-tines cannot push the weft thread which

leads from the cloth across the grid to the thread holding device for holding the weft thread taut through the grid as seen in Figs. 1 and 3.

In the foregoing description I have in designating the grid and the fork adopted the names known in the art and in trade as weft or filling-grid and weft or filling-fork, and it will be understood that these designations are identical with the term filling-detector as applied to the weft or filling-fork; and that the term "detecting beat" is identical with the forward movement of the lay.

I claim:

1. In a loom, the lay, a filling grid, a filling-fork, and an instrument actuated by the lay for holding the filling thread between the shuttle and said grid, to prevent the filling thread from being forced through said grid by said fork.

2. In a loom, the lay, a filling grid, a filling fork, and a clamp one member of which is mounted on the breast-beam, the other member mounted on the lay, for holding the filling thread between the shuttle and said grid for the purpose of preventing the filling thread from being forced through the grid by said fork.

3. In a loom, the lay, a filling-grid, a filling fork, and a clamp one member of which is mounted to slide under spring pressure, the other member mounted on the lay and adapted to actuate the slidable member, for the purpose of preventing the filling thread from being forced through the grid by said fork.

4. In a loom, the lay, a filling-grid, a filling-fork, and a clamp of co-acting cushioned members, one of which is spring pressed and adapted to seize and hold the filling thread between the shuttle and the said grid, for the purpose stated.

5. In a loom, the lay, a filling-grid, a filling-fork, and a clamp one member of which is an arm carried by a spring pressed rod, the other member mounted to actuate said spring pressed arm to clamp and hold the filling thread between the shuttle and said grid, for the purpose stated.

6. In a loom, the lay, a filling grid, a filling-fork, and a clamp of two members one of which is carried by the lay between the grid and the shuttle, the other member mounted on the breast-beam to receive the impact of the lay member, for the purpose specified.

7. In a loom, the lay, a filling grid, a filling-fork, and a clamp comprising a pair of cushioned members, either or both of which are pivoted and one actuating the other to seize and to hold the filling thread between the shuttle and the grid for the purpose stated.

8. In a loom, the lay, a filling grid, a filling-fork, and a clamp comprising a pair of cushioned members one of which is carried by the lay at a side of the grid, the other member carried at one side of the filling fork in alignment with the lay member and actuated by it, for the purpose specified.

9. In a loom, a lay, a filling grid, a weft fork, and means outside the shuttle for preventing the filling thread from being forced through the weft grid by the weft fork.

10. In a loom, the lay, a filling-grid, a filling-fork, and means outside the shuttle for clamping and holding the filling thread in advance of the filling fork pressing the filling thread against the bars of the grid.

11. In a loom, the lay, a filling-grid carried on the lay, a filling-fork pivotally mounted on a slide-way on the breast-beam, in combination with means for operating upon the weft-thread which extends between the weft-grid and the shuttle when in the shuttle-box for preventing the weft-thread from being forced through the weft-grid by the weft-fork.

12. In a loom, a lay, a weft grid, a weft fork, and means outside the shuttle yieldingly engaging the weft thread to prevent it from being forced through the grid by said fork.

13. In a loom, a lay, a filling grid, a weft fork, a shuttle box, a surface between the filling grid and the shuttle-box adjacent thereto against which a filling thread may be

clamped and means to clamp the filling thread against said surface, thereby to prevent the weft fork from forcing the filling thread through the grid.

14. In a loom, a lay provided with a shuttle-box, a grid near the mouth of the shuttle-box provided with a vertical recess at the box side, a yielding filling for said recess, a weft-fork movable across the lay in front of the grid as the lay beats up, and means to hold the weft-thread between the grid and the shuttle when the latter is boxed, the grid sustaining the weft-thread in front of the weft-fork while the holding means maintains the weft-thread taut when engaged by the weft-fork, whereby the action of the latter is rendered certain.

15. In a loom, a lay provided with the shuttle-box, a grid near the mouth of the shuttle-box, a shuttle, a weft-fork, and yieldingly mounted means independent of the lay and of the shuttle to act upon the weft or filling-thread between the shuttle and the grid and maintain the filling-thread taut across the grid to be engaged by the weft-fork as the lay beats forward.

16. In a loom, a lay provided with a shuttle-box, a grid near the mouth of the shuttle-box, a shuttle, a weft-fork, and means yieldingly mounted at right angles to the grid at the box side thereof and independently of the lay to act upon the weft-thread between the shuttle and the grid and maintain the weft-thread taut across the grid to be engaged by the weft-fork as the lay beats up, the grid sustaining the weft-thread while the holding means prevents the slip of the filling and maintains it properly taut between the shuttle and the cloth.

17. In a loom, a lay provided with a shuttle-box, a shuttle, a weft-fork, a grid near the mouth of the shuttle-box and yieldingly-mounted means to co-operate with means carried by the lay between the shuttle-box and the grid and hold the weft or filling-thread in position to be sustained by the grid and thereby presented taut to the filling-fork on the forward beat of the lay.

18. In a loom, a lay provided with a shuttle-box, a grid near the mouth of the box, a weft or filling-fork; and means outside the shuttle to act upon the filling between the shuttle and the grid and hold the filling-thread taut across the grid in front of the fork.

19. In a loom, a lay provided with a shuttle-box, a grid near the mouth of the box, a weft or filling-fork, a finger mounted on the breast-beam and having its free end depending at one side of and in advance of the fork, and a pad on the finger to engage the filling between the shuttle and the grid and hold it taut across the grid in front of the fork on the forward beat of the lay.

20. In a loom, a lay provided with a shuttle-box, a grid near the mouth of the box, a filling or weft-fork, and yieldingly mounted means normally projecting beyond the plane of the fork to act upon the filling between the shuttle and the grid and hold the filling taut across the grid in front of the fork on the forward beat of the lay.

21. In a loom, a lay provided with a shuttle-box, a grid near the mouth of the shuttle-box, a filling-fork or filling detector movable across the raceway of the lay in front of the grid as the lay beats up, and means to clamp the filling between the grid and the shuttle when the latter is boxed, the grid sustaining the filling in front of the fork or detector while the clamping means maintains the filling taut when engaged by the detector, whereby the action of the latter is rendered certain.

22. In a loom, a lay provided with a shuttle-box, a grid near the mouth of the shuttle-box, a filling-fork or filling-detector to detect presence or absence of the filling in front of the grid when the shuttle is in the shuttle-box, and means supported independently of the lay to clamp the filling between the shuttle and the grid on the detecting beat of the lay, the grid sustaining the filling and insuring certainty in the action of the detector while the clamping means prevents slip of the filling and maintains it properly taut between the shuttle and the cloth.

23. In a loom, a lay provided with a shuttle-box, a grid near the mouth of the shuttle-box, a shuttle, a filling-fork or filling-detector, and yieldingly-mounted means independent of the lay and the shuttle to act upon the filling between the shuttle and the grid and maintain the filling

taut across the grid to be engaged by the filling-detector on the detecting beat of the lay.

24. In a loom, a lay provided with a shuttle-box, a grid near the mouth of the box, a filling-fork, and means outside the shuttle to act upon the filling between the shuttle and the grid and draw the filling taut across the grid in front of the fork on the detecting beat of the lay.

25. In a loom, the lay, the shuttle-box, the shuttle, and a weft-fork, and means carried on and movable with the

lay for forcing the weft-thread against said fork, in combination with means for holding the weft-thread located between said weft-fork and the shuttle.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANCIS ARTHUR MILLS.

Witnesses:

A. E. H. JOHNSON,
THOMAS HOOD YEAGER.