

H. LINDSAY.

WIRE LOOM.

APPLICATION FILED AUG. 1, 1904.

Patented Feb. 11, 1913.

3 SHEETS-SHEET 1.

1,052,929.

Fig. 1.

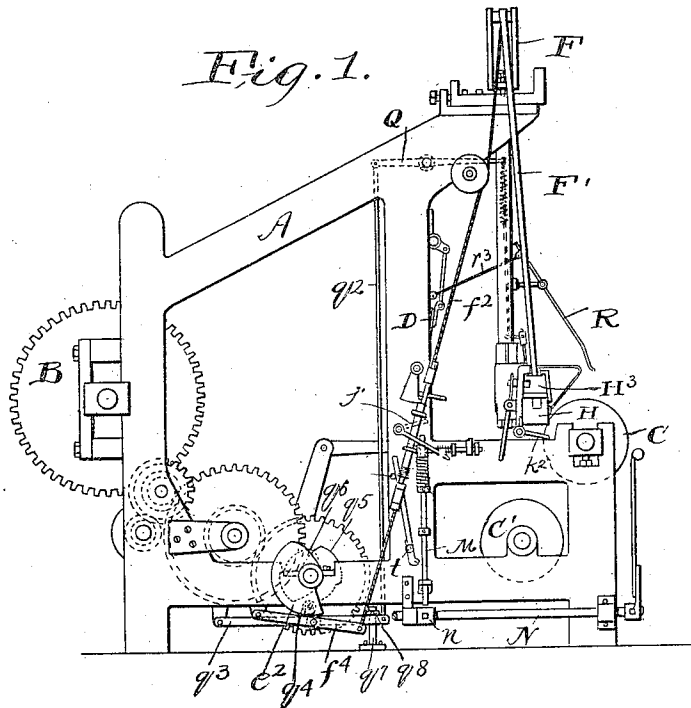
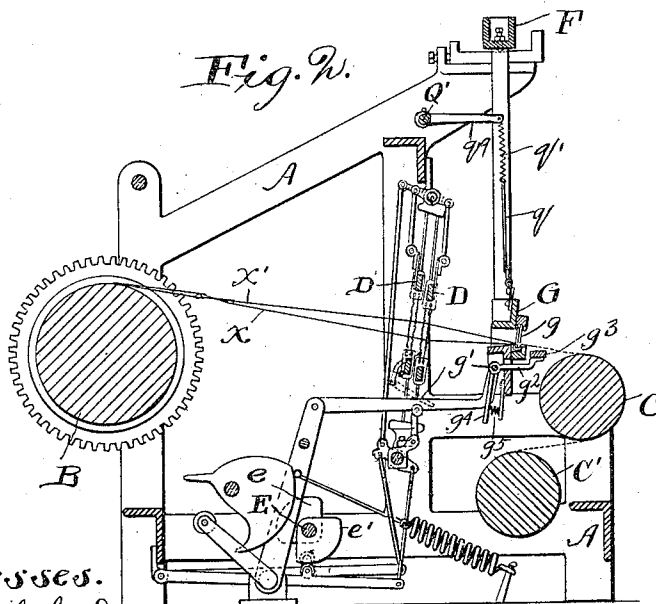


Fig. 2.



Witnesses.

E. B. Gilchrist
B. W. Brockitt

Inventor.

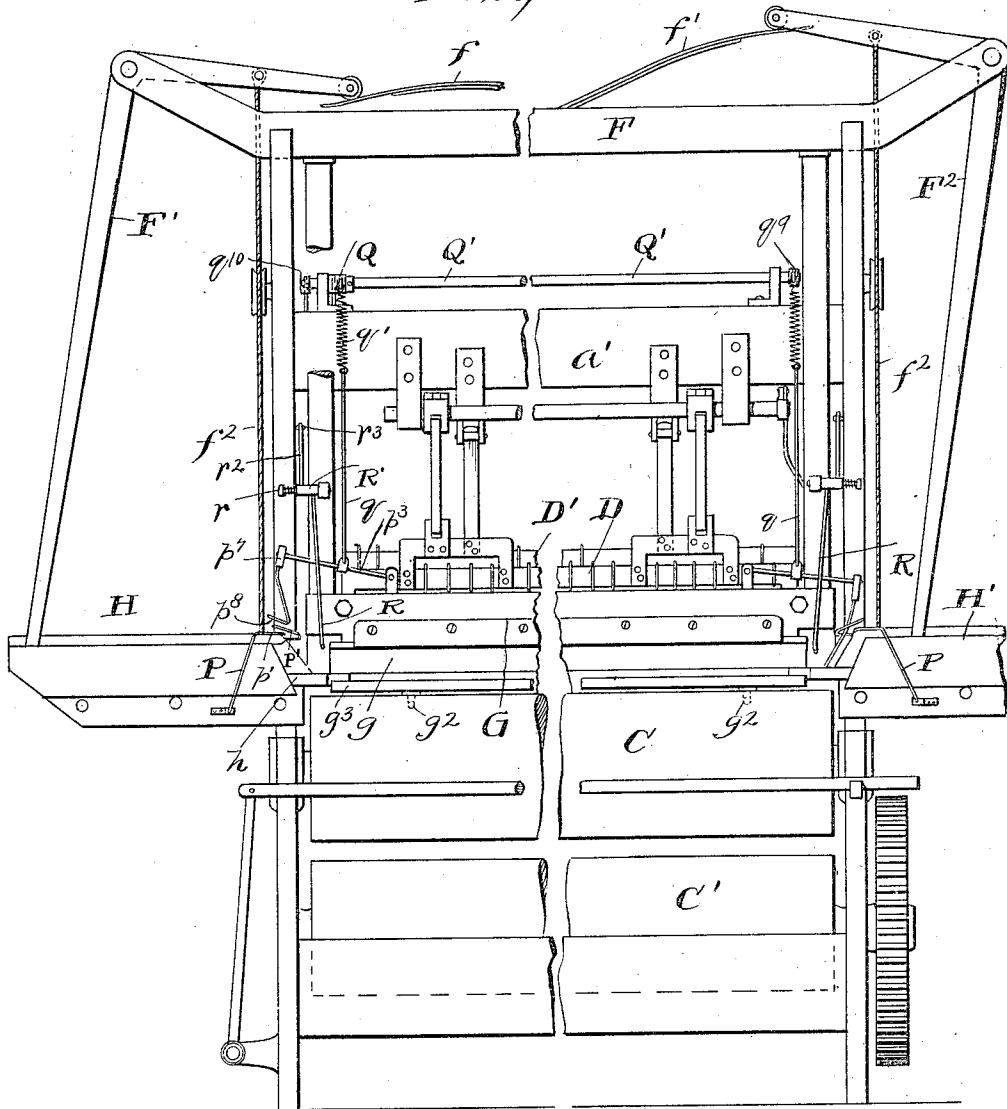
Hamilton Lindsay,
By his Attorneys,
Thurston & Bates.

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3 SHEETS—SHEET 2.

Fig. 3.



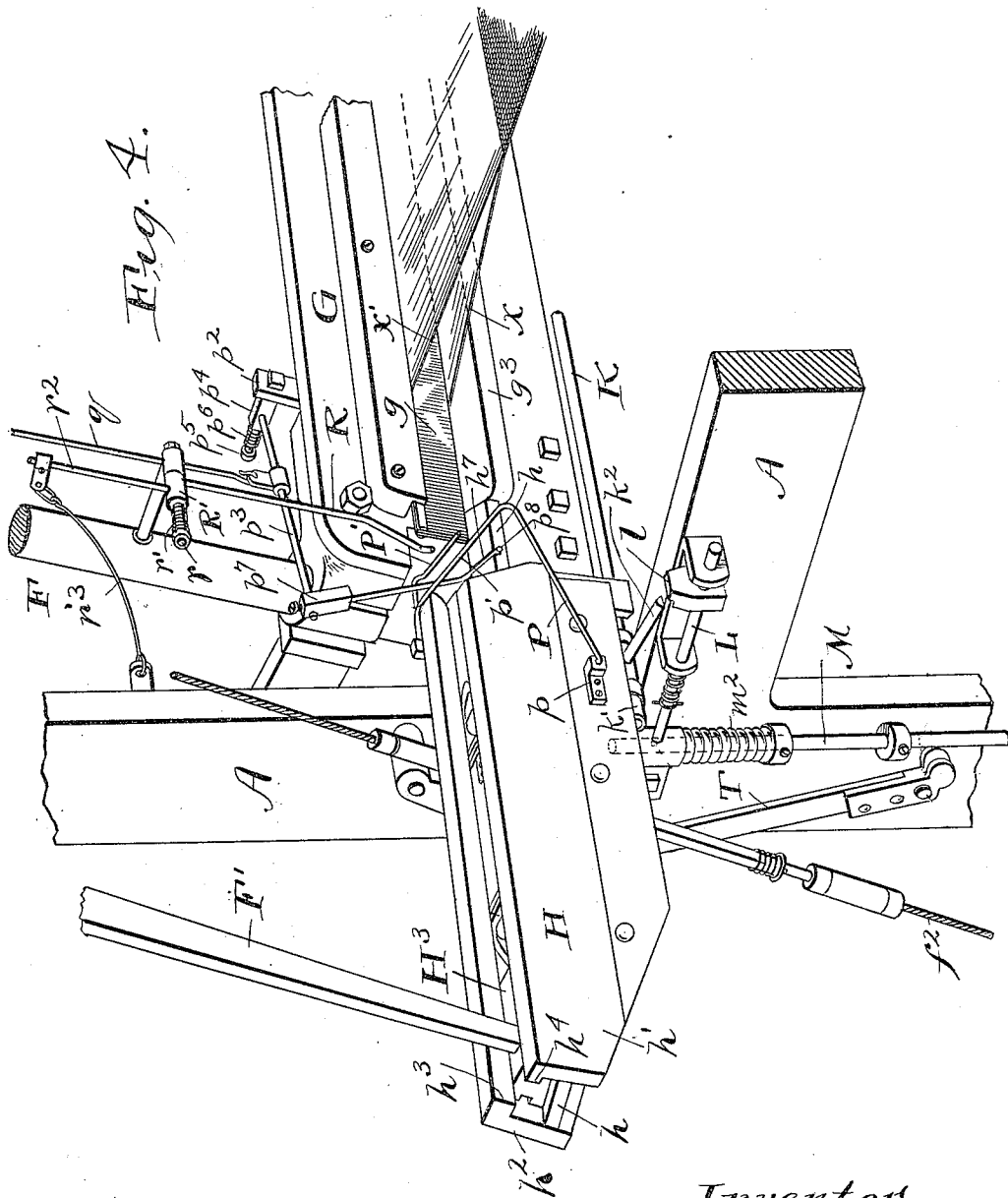
E. B. Gilchrist
B. W. Brockitt.

Hamilton Ruessay,
By his Attorneys,
Thurston Bates

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3 SHEETS—SHEET 3.



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B. W. Brockitt

Inventor.
Hamilton Lindsay,
By his Attorneys,
Thurston & Bates.

UNITED STATES PATENT OFFICE.

HAMILTON LINDSAY, OF CLEVELAND, OHIO.

WIRE-LOOM.

1,052,929.

Specification of Letters Patent.

Patented Feb. 11, 1913.

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To all whom it may concern:

Be it known that I, HAMILTON LINDSAY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Wire-Looms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The invention broadly relates to the class of looms, and more particularly to those for weaving wire cloth, as set forth in my prior Patents No. 731,112, granted June 16, 1903, and No. 844,818, granted February 19, 1907.

More particularly, the invention relates to certain improvements upon the construction set forth in the above mentioned patents, and has reference to the mechanism for stretching the wire weft after it has been laid in the shed and before it has been followed up by the reed upon the batten.

The invention may be briefly summarized as consisting in the construction and combination of parts hereinafter described, reference being had to the following description, drawing and claims.

Referring to the drawings, Figure 1 is a side elevation of the machine; Fig. 2 is a vertical cross section; Fig. 3 is a front elevation broken away at its center; Fig. 4 is a perspective view of the shuttle box and the adjacent parts.

This invention may be applied to any suitable construction of loom, preferably the type of machine illustrated in the patents referred to, wherein—

A represents the frame provided with suitable bearings *a* for supporting the warp beam B, having suitable grooves for receiving the warp threads. On the forward part of the frame is the guide roller C and the cloth beam C' for guiding and winding up the cloth after it has been woven. Suitable gears and mechanism are provided between the warp beam and the cloth beam C' for giving off the warp threads from the former and for winding up the finished cloth upon the latter. This mechanism is covered by the said prior Patent No. 731,112, and forms no part of this case,—it being only necessary that there be such a device in order that there will be a tension upon the warp threads, and that the cloth will be wound up after it is finished.

The heddle frames are represented at D and D'. These heddles are moved up and

down through the instrumentality of the cams *e* and *e'* upon the shaft E, by suitable connecting mechanism. The movement of the heddles causes the ranks X and X' of the warp threads to cross each other and thus form the shed.

Pivoted to the upper part of the frame is the batten frame F, which carries the picker arms F' and F², lay G, and shuttle boxes H and H'. Suitable mechanism is provided for imparting a strong and quick movement to the lower ends of the picker staff so that when in turn each picker staff engages the shuttle, the same will be shot across the race to the opposite shuttle box. In the embodiment shown, this mechanism includes springs *f* and *f'*, cables *f*², levers *f*⁴ and cams *e*².

Carried by the lay G is the reed *g* secured in any well known manner, with the ranks X and X' of the warp threads passing therethrough. Secured in the lay, and preferably at the rear thereof, is a rock shaft *g'* provided with forwardly projecting arms *g*² rigid with said shaft and carrying at their free ends the shuttle race *g*³. A spring *g*⁵ normally tends to hold the shuttle race in its lowermost position—that is, out of engagement with the warps and the finished cloth. This shuttle race, however, is arranged to be moved into its uppermost position or under the lower rank X of the warp threads when the lower end of the batten is in its rearward position.

Secured to the batten F, at each end of the lay, are the shuttle boxes H, H'. These boxes are of substantially the construction shown in the drawings, having a bottom plate *h*, front plate *h'*, and a rear plate *h*²,—the front plate *h'* and the rear plate *h*² being provided with inwardly projecting lips or flanges *h*³ and *h*⁴, which serve to keep the picker block H³ in the shuttle box. All of these parts are of ordinary construction and are well known in the art.

A rock shaft K carried by the shuttle boxes has an arm *k*² at each end adapted, in case the shuttle fails to enter the boxes, to swing to position to engage block *l* carried by trigger L and so release rod M which is then shot downward by spring *m*² and caused to rotate shaft N and shut off the power. This shut-off mechanism can be reset by means of the lever T.

The mechanism for creating a tension upon the weft or shoot, after it has been laid in the shed, consists of a pair of rigid arms

P and P' arranged just above the entrance to each shuttle box and spaced a short distance apart. One of these arms P is secured to the rear of the shuttle box at one end, passing across the entrance to the shuttle box with a straight portion p' and down at the side and down in front, to a clip p secured to the front of the shuttle box. The other arm extends out with a prong substantially parallel to the straight portion p' of the clip P, and is left free at its end so that the weft may be readily kicked therefrom. Pivoted to a bracket p^2 upon the lay of the batten is a lever arm p^3 which has a block p^4 loosely mounted upon the pin p^5 secured in said bracket p^2 . A spring p^6 is arranged between the head of the pin and the block p^4 for giving the lever arm a normal downward tendency. Upon the free end of the lever arm p^3 is secured a block p^7 carrying a downwardly projecting finger p^8 which has a turned end portion adapted, when raised, to pass between the straight portion p' and the prong P', but to normally rest in a recess h^7 in the projected bottom plate h of the shuttle box, whereby, as the shuttle is shot from one box to the other, the weft will be laid across the end portion of said finger in a position to be engaged thereby when raised. The means for raising these fingers consists, on the left hand side of the machine, of a link q connected to a spring q' secured to the end of a lever Q loosely mounted upon a rock shaft Q', and connected at its opposite end to a long link q^2 extending down and connected to an operating lever q^3 , which has a friction roller q^4 for engagement by one of the cams q^5 and q^6 . These levers are provided with openings at their forward ends which are engaged by standards q^7 provided with adjusting blocks q^8 to limit the upward movement of said levers. The pair of rigid arms P P', and the finger, p^8 , together with its lever p^3 and spring p^6 , is provided at each end of the lay, and the mechanism for operating the one at the left has been described. The mechanism for operating these same parts at the other side of the machine consists of an arm q^9 keyed to the rock shaft Q' and rocked by an arm q^{10} connected by a link to a lever similar to the lever q^3 and operating in a like manner. It will be seen from the mechanism just described, that as the shuttle enters its box, it leaves the weft wire lying across the finger p^8 just as the batten is about to move forward to follow up the weft and press it toward the finished fabric. At this particular time the cam q^5 shifts the lever q^3 and, through the train of connections just described, raises the lever arm p^3 and its finger p^8 , whereby the weft is drawn slightly within the shed and up between the arms P and P'. Means are provided for further stretching and kicking off the weft from the

end of the finger p^8 and of the arm P, and this mechanism consists of a prong R carried by a sleeve R' loosely mounted upon a pin r and having a spring r' between it and the pin, whereby the prong R is normally kept in its rearward position, when the batten is also in its rearward position. Extending upward from the sleeve R' is an arm r^2 connected by a flexible connection r^3 with the frame work A, whereby upon the forward movement of the batten the prong R moves forward and gives a further stretch to the weft and kicks it from the end of the arm P and from the end of the finger p^8 .

Having described my invention, I claim:

1. In a loom, in combination, a batten having shuttle boxes, an arm adjacent each shuttle box and movable with the said batten, and a finger carried by said batten adjacent each shuttle box and movable independently of the movement of the batten, and means for actuating said finger and arm to catch the weft after it is laid in the shed and tighten the same without stopping the loom.

2. In a loom, in combination, a batten having shuttle boxes, a pair of arms adjacent each shuttle box and movable with the said batten, a movable finger carried by said batten intermediate each pair of arms, means for actuating said finger to catch the weft after it is laid in the shed and tighten the same, and means for removing the weft from said finger.

3. In a loom, in combination with the batten, shuttle boxes carried thereby, a shuttle, an arm secured to said batten, another arm suitably pivoted and carried by the batten and carrying a finger, and means for actuating said finger to engage the weft after it is laid and pull the same against said arm and past it.

4. In a loom, in combination with the batten having suitable shuttle boxes, an arm secured to the batten, at the entrance to each shuttle box, an arm pivotally mounted upon the batten, a finger carried by said arm and arranged to normally remain below the surface of the bottom of the shuttle box, means for normally retaining said finger in said position, and means for raising said arm to lift said finger and draw the weft against said arm and thereby tighten the same, a kicker member pivoted upon the batten, and connections between the frame and said member whereby upon the forward movement of the batten said member will kick the thread from said finger and said arm.

5. In a loom, in combination with the batten, shuttle boxes carried thereby and adapted to receive a shuttle, a fixed member, an arm suitably pivoted and carrying a finger, means for actuating said finger to engage the weft after it is laid and pull the same against said fixed member, a kicker member suitably pivoted, means for nor-

ably retaining said member in inoperative position, and means for rocking said member to kick the weft from said finger and said arm.

6. In a loom, in combination with the batten, shuttle boxes carried thereby and adapted to receive a shuttle, an arm rigidly mounted upon said batten, an arm pivoted to said batten and carrying a finger, means for actuating said finger to cause it to engage the weft after it is laid and to pull a loop of it beyond said arm, a kicker member pivoted upon the batten, a spring for normally retaining said kicker member in one position, a lever arm for rocking said kicker member, and a connection between said lever arm and the frame whereby upon the movement of the batten said kicker will be operated.

7. In a loom, in combination, with the batten, an arm beneath which the weft passes, and a movable finger above which the weft passes, and means for raising said finger past the arm a distance independent of the throw of the batten to bend the thread upward against said arm.

8. In a loom, the combination, with the batten, of an arm and a movable finger both carried by the batten and normally occupying positions on opposite sides of the path of movement of the shuttle, and means for moving said finger past said arm after the shuttle has laid the weft between them, whereby the weft is tightened, such finger actuating means being independent of the amount of velocity of the movement of the batten.

9. In a loom, in combination with the batten, shuttle boxes carried thereby and adapted to receive a shuttle, a movable finger, means for actuating said finger to engage the weft and pull it through the shed, an arm to resist such pull, and means mounted on the batten for engaging the weft to remove it from said finger.

10. In a loom, the combination of a pair of shuttle boxes, a pair of tightening devices located between the shuttle boxes adjacent to the entrance to each shuttle box respectively, said tightening devices consisting each of a member beneath which the shuttle is adapted to pass and a movable member adapted to occupy a recess in the raceway whereby the shuttle may pass over it, and mechanism operating without stopping the loom for raising the movable member and causing it to move past the member.

11. In a loom, the combination with the shuttle, the shuttle boxes and shuttle-race between them, of a movable tightening member adapted to normally seat in a recess in the shuttle race adjacent to the shuttle box, a cooperating member beneath which the shuttle shoots, and means for raising said movable member with the weft

on top of it past said cooperating member, whereby the weft is drawn taut and bent.

12. In a loom, the combination, with the batten, of a shuttle box carried thereby, a pair of members between which a weft may pass, and means for moving one of said members entirely past the other after the weft is laid between the same, and means for removing the weft from the said movable member, the amount of the movement of said movable member being independent of the movement of the batten.

13. In a loom, a batten provided with a shuttle box, means carried by the batten providing a shoulder near the mouth of the shuttle box, and means carried by the batten acting upon the weft and independently movable therefrom between the shuttle and the cloth to deflect the weft beyond said shoulders and thereby draw it taut.

14. In a loom, a batten provided with a shuttle box, means carried by the batten presenting a shoulder against which the weft may be deflected, and a movable member carried by the batten having movement independent thereof and automatically operating to deflect the weft beyond such shoulder.

15. In a loom, a batten provided with a shuttle box, a pair of fingers and a finger intermediate thereof, all carried by the batten adjacent to said shuttle box, said fingers being located to allow the weft to be laid between said intermediate finger and said pair of fingers, and means for giving relative movement to such combination of fingers to deflect the weft between and beyond the pair of fingers.

16. In a loom, the combination with a batten, of a pair of arms, across which the weft passes and a finger across which the weft passes, the weft passing between said finger and said pair of arms, said arms and said finger being carried by the batten, and means automatically operating for each cycle of the batten for imparting relative movement to said arms and finger to move one past the other when the weft is between them to bend the thread against said arms.

17. In a loom, a batten, an arm and a finger normally occupying positions on opposite sides of the path of movement of the shuttle, said arm and said finger being carried by the batten, and means automatically operating for each cycle of the batten for relatively moving said finger and arm past each other after the shuttle has passed between them, whereby the weft is tightened, the movement of such finger actuating means being independent of the movement of the batten.

18. In a loom, the combination with a batten, of a member and a finger normally occupying positions on opposite sides of the path of movement of the shuttle, and means for giving said member and said finger a

relative movement causing the one to pass the other after the shuttle has laid the weft between them, whereby the weft is tightened, there being a recess in the shuttle raceway which one of said members normally occupies.

19. In a loom, the combination with the batten, of a pair of shuttle-boxes carried thereby, a pair of tightening devices located between the shuttle boxes, adjacent to the entrance to each box respectively, said tightening devices consisting each of a stationary member and a movable member, across and between which the shuttle may pass, both of said members being carried by the batten, and the movable member normally occupying a recess in the shuttle-race, and mechanism for moving the movable member and causing it to move past the stationary member when the weft is between them.

20. In a loom, the combination, with a batten and its shuttle box, of a shoulder against which the weft may be bent, a movable arm depending adjacent said shoulder and adapted to be moved past the same, a pivoted arm supporting the movable arm, an operating link connected with the pivoted arm, and means for actuating said link at predetermined times during the operation of the loom to cause said movable arm to engage the weft and draw it over said shoulder.

21. In a loom, a batten provided with a shuttle box, a movable finger carried by said batten and normally seated below the plane of the race, means for actuating said finger to catch the weft after it is laid in the shed and tighten the same, and means operative substantially at the end of the forward movement of the batten for removing the weft from the movable finger.

22. In a loom, a batten provided with a shuttle box, a finger carried by said batten and adapted to be moved independently of

the movement of the batten, a member carried by the batten adjacent to said finger, and means for moving said finger past said member after the weft is laid in the shed, thus tightening the weft.

23. In a loom, the combination of a batten, a shuttle box and shuttle race way carried by the batten, a movable finger and a member carried by the batten on opposite sides of the shuttle raceway and adjacent to the mouth of the shuttle box, and means for moving said finger past said member after the shuttle has entered its box whereby the weft is deflected and tightened.

24. In a loom, the combination of a batten, a shuttle box and shuttle raceway carried by the batten, a movable finger carried by the batten outside of the raceway and adjacent to the mouth of the shuttle box and so located that the weft when laid shall cross said finger, means for operating said batten, means independent of said batten operating means for moving said finger with the weft across it to tighten the weft, and means for kicking the weft off the finger.

25. In a loom, the combination with a batten provided with a shuttle box adapted to receive a shuttle, a member mounted upon the batten presenting a shoulder across which the weft may pass, a finger mounted upon the said batten but capable of movement independently thereof, means for operating said batten, and means independent of said batten-operating means for actuating said finger to engage the weft and draw it past said shoulder.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

HAMILTON LINDSAY.

Witnesses:

N. L. BRESNAN,

B. W. BROCKETT.