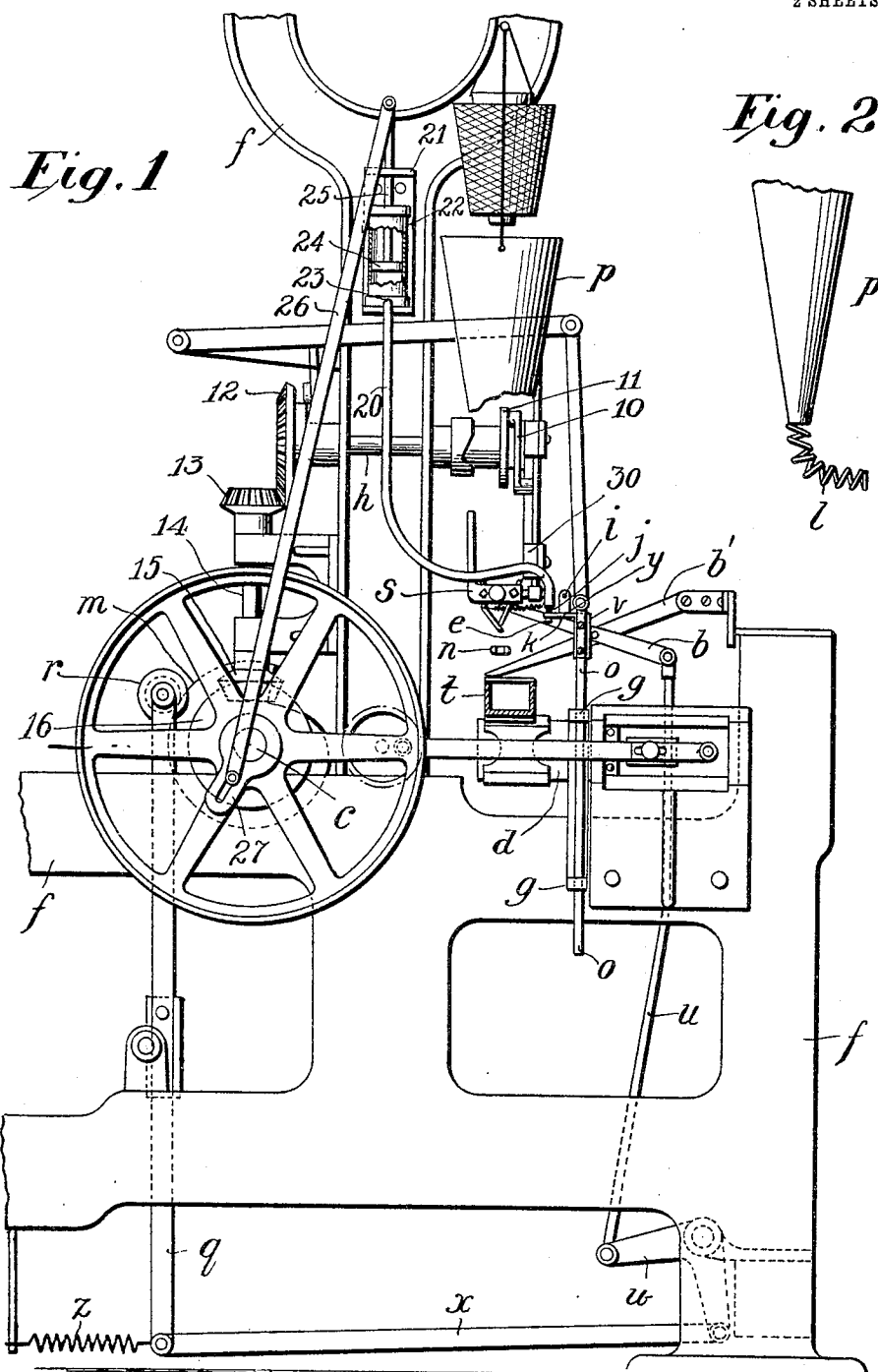


G. S. COX.

WEFT POSITIONING MEANS FOR LOOMS.

APPLICATION FILED DEC. 31, 1903.

2 SHEETS—SHEET 1.



WITNESSES:

William J. Marks
M. M. Hamilton

INVENTOR
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ATTORNEYS

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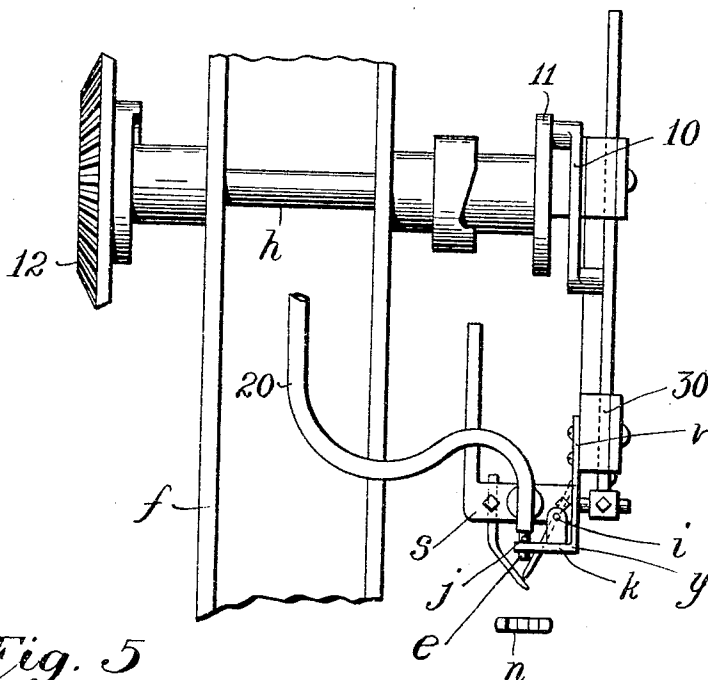
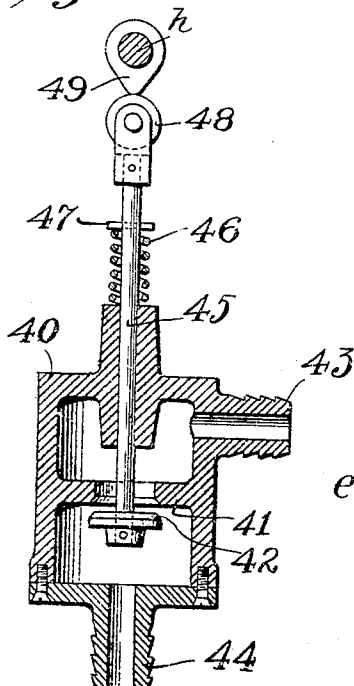


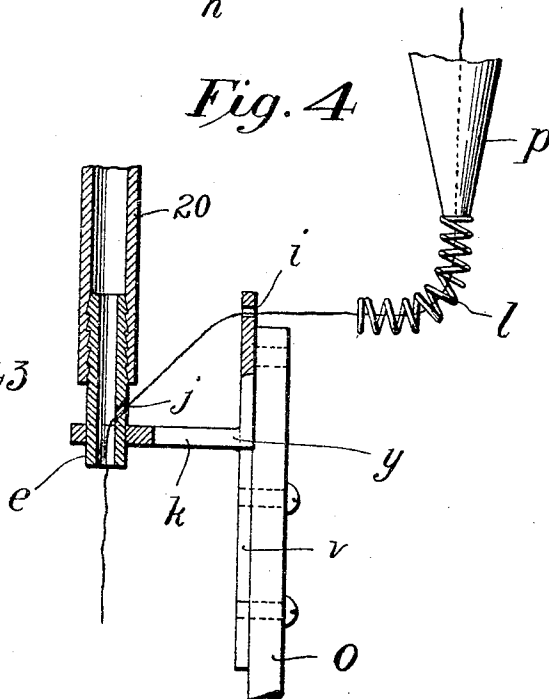
Fig. 3

Fig. 5



WITNESSES:
William B. Markes
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Fig. 4



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Gerald Cox
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UNITED STATES PATENT OFFICE.

GEORGE S. COX, OF FITZWATERTOWN, PENNSYLVANIA, ASSIGNOR TO HIMSELF, AND WALTER S. COX, OF PHILADELPHIA, PENNSYLVANIA, TRADING AS GEORGE S. COX AND BROTHER.

WEFT-POSITIONING MEANS FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 795,250, dated July 18, 1905.

Application filed December 31, 1903. Serial No. 187,315.

To all whom it may concern:

Be it known that I, GEORGE S. COX, a citizen of the United States, residing at Fitzwattertown, county of Montgomery, and State of Pennsylvania, have invented a new and useful Improvement in Weft-Positioning Means for Looms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to looms, and more particularly to looms adapted to the manufacture of that variety of cloth shown, described, and claimed in Letters Patent to Walter S. Cox, No. 726,648, dated April 28, 1903, in which sections of horsehair alternate with sections of yarn, and also that variety of cloth shown, described, and claimed in the patent issued to me September 13, 1904, No. 769,790, in which a pick of hair and a pick of yarn are contained in each shed of warp.

The object of my invention is to move and hold the free end of the yarn after it has been severed by the shears into a definite position, preferably a vertical position, after the yarn has been thrown across the shed by the nipper and severed by the shears, in order that the free end of the yarn may be in position to be grasped by the nipper preparatory to throwing the next pick of yarn. In an application filed by me on even date herewith, Serial No. 187,266, I have shown, described, and claimed means to effect this object, said means consisting specifically in imparting to the yarn-carrier a sudden downward and quick upward movement preparatory to the grasping action of the nipper, said movement tending to move the free end of the yarn from the somewhat horizontal position it would otherwise tend to assume and throw it into the approximately vertical position necessary to enable the nipper to grasp it. Such a contrivance operates satisfactorily when a cloth composed of alternate sections of hair and yarn is being woven, because in the said last-named application the trough containing the strands of hair is not directly under the yarn-carrier during the weaving of the yarn-section of cloth, and con-

sequently there is nothing under the yarn-carrier to interfere with its proper and intended operation, and the space below the yarn-carrier being free the yarn is thrown and straightened into a vertical position during the downward movement of the yarn-carrier. When, however, a cloth in which a pick of hair and a pick of yarn is contained in each shed is being woven, the selector for the hair and the carrier for the yarn are placed adjacent, so that the nipper may simultaneously grasp both the hair and yarn, and consequently the trough containing the strands of hair is maintained in position directly under the yarn-carrier as well as under the selector. It will hence be understood that the sudden downward movement of the yarn-carrier will not be under these conditions effective to throw the loose end of yarn into a vertical position, as such loose end will be thrown against the hair in the trough.

The present invention is adapted to cause the free end of the yarn to be straightened out into a substantially vertical position during the weaving of both of the described kinds of cloth and whether or not the hair-trough be below the yarn-carrier at the time the nipper is moved into position to grasp the yarn.

The invention consists in the provision of an air-blast adjacent to the yarn-carrier, which is adapted to blow the free end of the yarn into the position required to enable it to be grasped by the nipper; and the invention also consists in certain details of arrangement hereinafter set forth.

The invention is of course applicable to the weaving of any cloth wherein the yarn is severed, and it is necessary to present the severed end to a nipper for throwing the yarn across the loom and is, in fact, applicable to the weaving of any cloth wherein it is necessary to present weft to a weft-pick thrower or carrier.

The invention therefore is of course applicable to the weaving of a cloth consisting solely of picks of linen, cotton, or other yarn wherein instead of employing a regular shuttle the weft is cut off after each pick is thrown.

In the drawings, Figure 1 is a side view of the loom, exhibiting my invention, but omitting many parts of the loom which do not directly cooperate with the invention and which it is unnecessary to show and describe. Fig. 2 is a view of the spout and guide for the yarn. Fig. 3 is an enlarged side view of the yarn-carrier, selector, and air-blast pipe, in which a modified way of supporting the yarn-carrier is shown. Fig. 4 is a detail view, in side elevation, part-sectional, of the yarn-carrier and air-blast-pipe attachment. Fig. 5 is a detail view in section of valve and valve-box that may be interposed in the air-blast pipe.

f is the frame of the loom, having suitable bearings for the cam-shaft *c* and the shaft *h* for reciprocating the selector *s*.

t is the usual trough or receptacle containing the separate strands of hair.

y is the yarn-carrier for the linen, cotton, or other yarn.

n is the usual nipper, the action of which is to grasp one end of a strand of hair that has been previously selected from the trough by the selector *s* or the free end of the yarn carried by the yarn-carrier *y*, or both, and throw or pull them across the loom.

d is the frame or slide upon which the trough *t* is mounted.

b b' are the movable and fixed blades, respectively, of the cutter or shears for severing the yarn at or about the time its throw through the loom is completed.

The supporting means for the yarn-carrier shown consists of a rod *o* in a guide *g*, secured to the slide *d*. The yarn-carrier itself (see Fig. 4) consists of the plate *v*, having a bracket *k*, provided with an upturned portion having the infeed-orifice *i* and carries an open-ended tube *e*, having an orifice *j* through its wall. The thread extends from the source of yarn-supply through a spout *p*, the spiral spring-guide *l*, the infeed-orifice *i*, the orifice *j*, and out through the open or yarn outfeed lower end of the tube *e*.

The rod *o* may be held fixed in the guide *g*, or it may be given a comparatively slow downward movement by any suitable mechanism as the yarn is being pulled through the shed by the nipper in order to stop the rotation of the cloth-beam in case the nipper misses the yarn. Examples of mechanism for so reciprocating the rod *o* and mechanism whereby the cloth-beam is held from rotation in case a pick of yarn is missed are described in my last-named application. Such mechanism need not, however, be herein described, as it forms no part of my present invention. Indeed, not only is my invention wholly independent of any particular mechanism of this character, but such mechanism may be altogether omitted and the rod *o* held fixed in the guides *g*, as before stated, or otherwise immovably supported on the slide *d*, for the very

good reason that with my invention the nipper practically never misses the yarn.

As before stated, my invention is equally applicable whether the cloth to be woven is composed of alternate sections of hair or yarn or of a pick of hair or a pick of yarn in each shed of warp. To weave the first-named cloth, the slide *d*, carrying both the trough *t* and the yarn-carrier *y*, should be alternately moved first from left to right into the position shown in Fig. 1, so as to bring the trough *t* under the selector *s* and the yarn-carrier *y* out of operative relation with the nipper *n*, and then from right to left, so as to move the trough *t* from under the selector *s* and the yarn-carrier *y* into operative relation with the nipper *n*. In the first position, therefore, of the slide *d* picks of hair are thrown by the nipper, and in the second position picks of yarn are thrown. I have not shown any means for so moving the slide *d*, as such means form no part of my present invention. Indeed, the slide may, if desired, be moved by hand.

To weave the cloth consisting of a pick of hair and a pick of yarn in each shed of warp, the slide *d* is held immovable, so as to maintain the trough under the selector. It will be understood that by lengthening the bracket *k* of the yarn-carrier *y* so as to bring and maintain the tube *e* of the yarn-carrier *y* in a position adjacent to the selector without in any other respect changing the construction of the parts shown in Figs. 1 and 4, the nipper will grasp a pick of hair and a pick of yarn simultaneously, or the modified arrangement shown in Fig. 3 may be employed, in which the plate *v* of the yarn-carrier instead of being secured to the slide or frame *d* is secured to one of the guides 30, in which the selector *s* reciprocates.

The movable blade *b* of the shears is pivoted to the fixed blade *b'*, the latter being secured to the loom-frame. The movable blade is connected, by means of a link *u*, with one arm of a bell-crank lever *w*. The other arm of the bell-crank is connected by a link *x* with the lower end of an intermediately-pivoted lever *q*, the upper end of which carries a roller *r*. *m* is a cam on the cam-shaft *c*, having an abrupt descent from its highest to its lowest point, so that as the roller *r* overrides its highest point the spring *z*, acting upon the lower end of lever *q*, is free to draw that end of the lever *q* back, thus, through link *x*, bell-crank *w*, and link *u*, lowering the cutting end of blade *b* of the shears and severing the yarn. Immediately thereafter the cam *m* again acts upon the roller *r* to move the lever *q* to its illustrated position, thus again opening the blades of the shears. The mechanism for operating the shears is like that described in my last-named application.

The selector *s* will not be specifically described, as it is of a well-known construction. It is reciprocated by means of a connecting-

rod 10, pivoted to a crank-disk 11 on the shaft *h*. The bevel-gear 12 on shaft *h* is driven by a bevel-gear 13 on a vertical counter-shaft 14, turning in bearings in the loom-frame. The bevel-gear 15 on shaft 14 is driven by the bevel-gear 16 on the cam-shaft *c*.

The operation of the nipper and shears is as follows: The nipper grasps the free end of the yarn and pulls it through the warp-shed.

Just before the travel of the nipper is completed the shears sever the yarn, leaving a free end extending from the mouth of the tube *e*. The nipper then returns, again grasps the free end of yarn, again pulls the yarn across the shed, and the shears again sever the yarn, again leaving a free end of yarn extending from the mouth of the tube *e*. After the shears have severed the yarn and before the nipper has moved into position to grasp the yarn the mechanism hereinafter described is adapted to come into operation to move and hold the free end of the yarn into the definite vertical position necessary for it to assume to enable it to be grasped by the nipper. This mechanism I shall now describe.

The upper end of the tube *e* is formed with corrugations to enable it to receive one end of a pipe 20. The pipe 20 is connected with any suitable source of air-supply, so as to cause a blast of air to be blown through the tube intermittently or continuously. The effect of this blast of air is to cause the free end of the yarn projecting beyond the lower end of the tube to be blown out straight in a direction coincident with the direction of extension of the tube *e*, which, as shown, is vertical. The tube *e* is located directly over the line of travel of the nipper *n*, so that as the nipper moves forward to grasp the free end of yarn the latter will be in the precise position required for causing it with certainty to be grasped by the nipper. To produce the said blast of air, I may employ the following mechanism: 21 is a bracket secured to the loom-frame. 22 is a cylinder secured to the bracket and having a closed lower end and an open upper end. 23 is an orifice in the cylinder communicating with one end of the flexible pipe 20, the other end of which communicates with the upper end of the tube *e*, as before described. 24 is a piston-head in the cylinder 22, and 25 a piston-rod secured to the piston-head and extending up through and beyond the open end of the cylinder, its upper portion being guided in the bracket 21. The cylinder and piston form an ordinary type of pump. 27 is a crank on the crank-shaft, and 26 a connecting-rod connecting the crank 27 and the piston-rod 25. As the cam-shaft *c* revolves the piston is reciprocated and in every downstroke creates a blast of air through the flexible pipe 20, which is projected through the lower end of tube *e* and moves and holds the yarn in the position nec-

essary for it to assume to enable it to be grasped by the nipper *n*. It will of course be understood that it is necessary, or at least desirable, that the crank 27 should be placed in such position on the cam-shaft *c* that it will be acting to depress the piston and create the blast of air at the time that the nipper moves into position to grasp the yarn.

It will be understood that it is not necessary to connect the air-blast pipe with a pump. It may be connected with any suitable source of supply of compressed air, as with a compressed-air reservoir, which would produce a continuous supply of air, instead of an intermittent supply, as with a pump. It is desirable, however, that the air-supply should not only be intermittent, but that the current of air should be shut off until just before the nipper moves into position to grasp the free end of the yarn, as otherwise the tendency of the air-blast is not only to blow out the yarn straight, but to feed it forward, thus causing the nipper to grasp the yarn at a considerable distance from the end. This is liable to occur to some extent even where a pump is used. To obviate this, I may interpose in the flexible pipe connection 20 between the pump or reservoir and the yarn-carrier a valve-box 40, having a partition 41. The partition 41 is provided with an orifice in which a valve 42 is adapted to seat. 43 44 are ports in the valve-box on opposite sides of the partition, which ports communicate with the sections of the air-blast pipe. 45 is the valve-stem, and 46 a spring confined between the end of the valve-box and a projection 47 on the valve-stem, the spring serving to normally seat the valve. On the end of the valve-stem is a roller 48, adapted to be engaged by a cam 49 on the shaft *h* for the purpose of forcing the valve-stem downward and the valve off its seat and opening communication from the source of air-supply to the air-exit end of the pipe 20. The cam 49 is in such position that it opens the valve just before the nipper moves into position to grasp the yarn.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In a loom, in combination, an open-ended tube, means for forcing a current of air through the open end of said tube, a yarn-carrier, means enabling the yarn to extend from said yarn-carrier into said tube and out of the open end thereof, and a pick-throwing device adapted to grasp an end of yarn extending from the open-ended tube and pull it across the loom, substantially as described.

2. In a loom, in combination, an open-ended tube, a yarn-carrier carrying said tube, means enabling the yarn to extend from said yarn-carrier into said tube and out of the open end thereof, a pick-throwing device adapted to grasp an end of yarn extending from said tube

and pull it across the loom, a cutter adapted to sever the yarn, and means for forcing a current of air through the open end of said tube to move the free end of the yarn so severed
5 by the cutter into position to be grasped by the pick-throwing device, substantially as described.

3. In a loom, in combination, a yarn-carrier having a tube open at both ends and
10 orificed between its ends, the yarn carried thereby being adapted to extend through said orifice into said tube and thence out its lower end, a pick-throwing device adapted to grasp the yarn extending beyond the yarn-outfeed
15 end of the tube, a pipe communicating with the other end of the tube, and means to force a blast of air through said pipe, thereby blowing the yarn extending beyond the yarn-outfeed end of the tube into position to be grasped
20 by the pick-throwing device, substantially as described.

4. In a loom, in combination, a vertically-extending tube open at both ends and orificed between its ends, a bracket supporting said
25 tube and having an infeed-orifice, a source of yarn-supply, means to guide the yarn therefrom to said infeed-orifice, the yarn being adapted to pass from said infeed-orifice through the orifice in said tube and thence
30 out the lower end of the tube, a pick-throwing device adapted to grasp the yarn extending from the lower end of the tube and pull it across the loom, a cutter adapted to sever the yarn, a pipe communicating with the upper
35 end of the tube, and means to force a blast of air through said pipe, thereby blowing the free end of the yarn so severed into position to be grasped by the pick-throwing device, substantially as described.

5. In a loom, in combination, a yarn-carrier, a trough adapted to contain strands of hair, a selector adapted to select a strand of hair from said trough, a pick-throwing device
45 adapted to grasp an end of yarn extending from the yarn-carrier and a strand of hair selected by the selector and pull them across the loom, a cutter adapted to sever the yarn, and means adjacent to the yarn-carrier adapted to create a current of air to move the free
50 end of the yarn so severed by the cutter into position to be grasped by the pick-throwing device, substantially as described.

6. In a loom, in combination, a yarn-carrier, a pick-throwing device adapted to grasp
55 the yarn and pull it across the loom, a cutter adapted to sever the yarn, a pipe adjacent to the yarn-carrier, and means adapted to blow intermittent blasts of air through said pipe,

said means operating after the cutter has so severed the yarn, substantially as described. 60

7. In a loom, in combination, a pick-throwing device adapted to grasp the yarn and pull it across the loom, and means adapted to create an intermittent current of air to move the yarn into position to be grasped by the
65 pick-throwing device, substantially as described.

8. In a loom, in combination, a pick-throwing device adapted to grasp yarn and pull it across the loom, means creating a current of
70 air to move the yarn into position to be grasped by the pick-throwing device, and means additional to the air-current-creating means to cause said current to act upon the yarn intermittently, substantially as described. 75

9. In a loom, in combination, a pick-throwing device adapted to grasp the yarn and pull it across the loom, a cutter adapted to sever the yarn, means adapted to create a current of air to move the free end of yarn so severed
80 into position to be grasped by the pick-throwing device, and means additional to the air-current-creating means to prevent said current from acting upon the yarn except just prior to said grasping action of the pick-throwing
85 device, substantially as described.

10. In a loom, in combination, an open-ended tube, means for forcing intermittent blasts of air through said tube, a yarn-carrier, means enabling the yarn to extend from
90 such yarn-carrier into said tube, and out of the open end thereof, and a pick-throwing device adapted to grasp an end of yarn extending from the open-ended tube and pull it across the loom, substantially as described. 95

11. In a loom, in combination, a yarn-carrier, a trough adapted to contain strands of hair, a selector adapted to select a strand of hair from said trough, a pick-throwing device
100 adapted to grasp an end of yarn extending from the yarn-carrier and a strand of hair selected by the selector and pull them across the loom, a cutter adapted to sever the yarn, and means to create intermittent blasts of air to move the free end of the yarn so severed
105 by the cutter into position to be grasped by the pick-throwing device, said means operating after the cutter has so severed the yarn, substantially as described.

In testimony of which invention I have here-
unto set my hand, at Philadelphia, on this 28th
day of December, 1903. 110

GEORGE S. COX.

Witnesses:

M. M. HAMILTON,
WILLIAM B. MARKS.