4 Sheets, Sheet. 1.

W. S. Laycock,

Hair Cloth Loom.

No. 110,050. Patented Dec. 13. 1870.

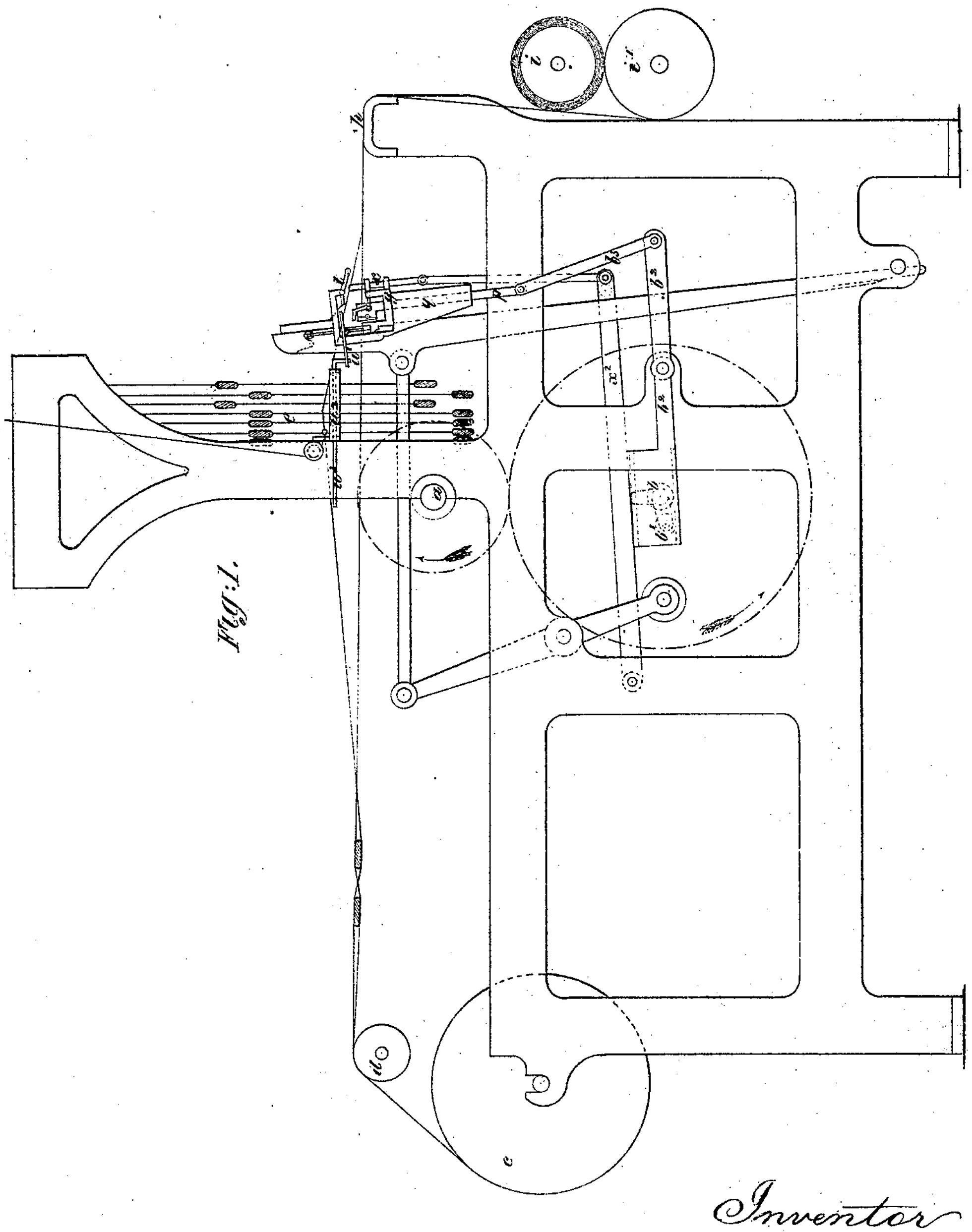

Fig: 1.

Witnesses
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4 Sheets, Sheet 2.

W. S. Laycock,

Hair Cloth Loom.

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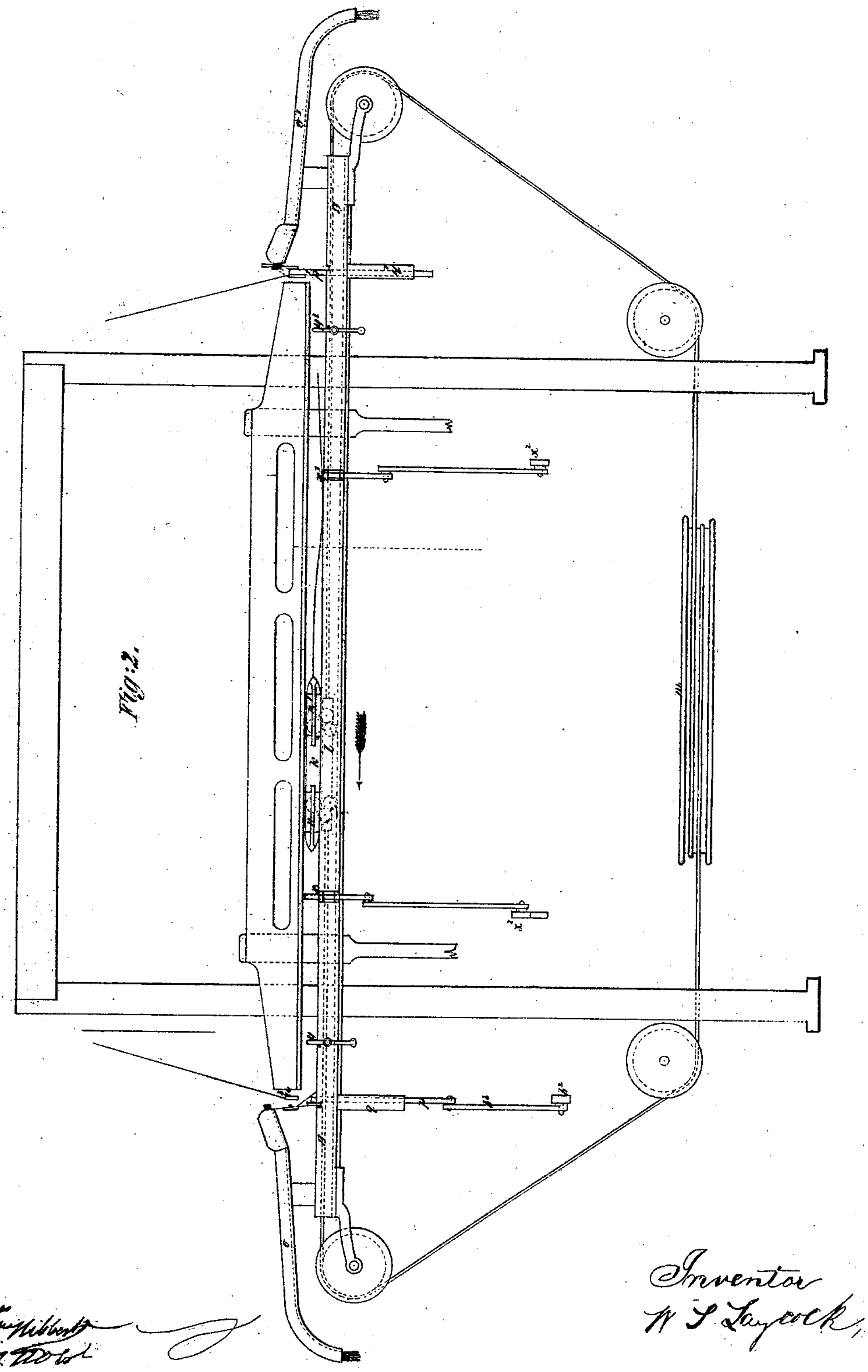

Fig: 2.

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4 Sheets, Sheet 3.

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No. 110,050. Patented Dec. 13. 1870.

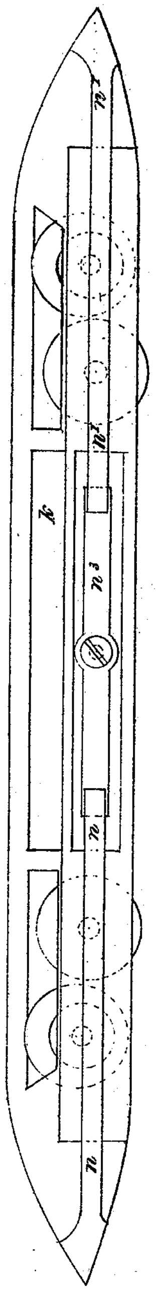

Fig: 3.

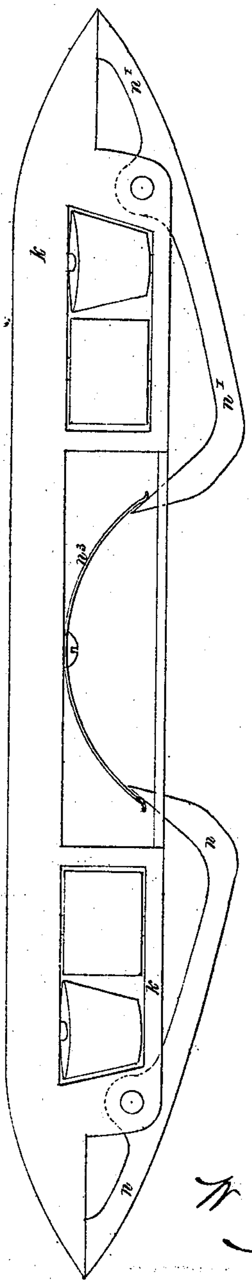

Fig: 4.

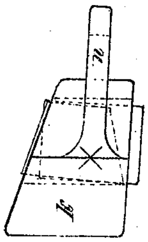

Fig: 5.

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4 Sheets, Sheet. 4.

W. S. Laycock,

Hair Cloth Loom.

No. 110,050. Patented Dec. 13. 1870

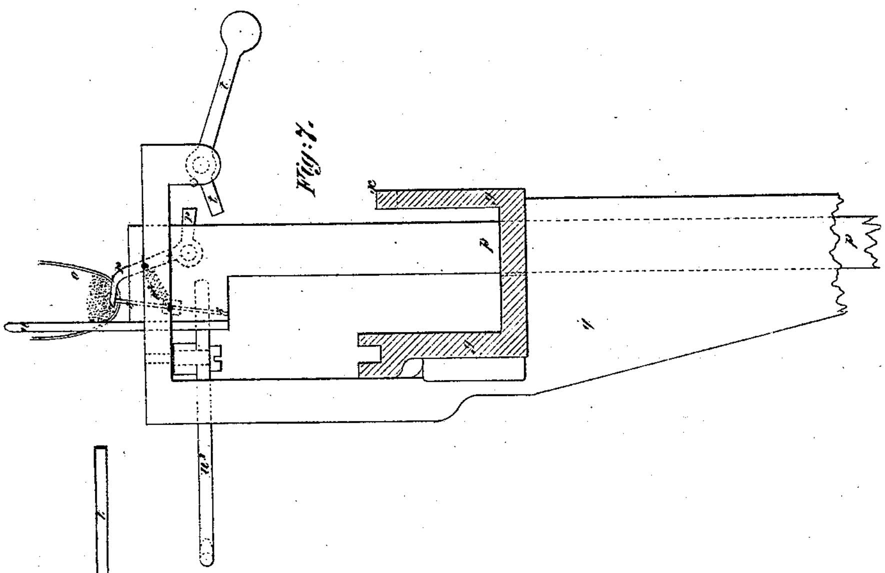
Fig: 7.

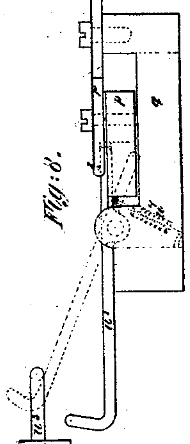
Fig: 8.

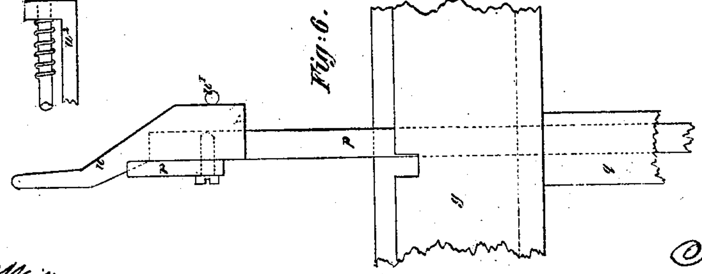
Fig: 6.

Witnesses
Ofyn Hibbert
G J Abbot

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UNITED STATES PATENT OFFICE.

WILLIAM SAMUEL LAYCOCK, OF SHEFFIELD, ENGLAND.

IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. **110,050**, dated December 13, 1870.

To all whom it may concern:

Be it known that I, WILLIAM SAMUEL LAYCOCK, of Sheffield, in the county of York, England, have invented new and useful Improvements in Weaving certain kinds of Fabrics; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification.

The fabrics to which my invention is applicable are those in which the weft is horse-hair or other materials in short lengths.

My invention consists in certain improved apparatus for opening the jaws for taking and releasing the hairs; and it further consists in improved weft-stop motions, one at each side of the loom, the said motions being connected with the pawl-catches of the ratchet-wheel which works the jacquard to make the sheds; also, with the take-up pawl, so that in the case of the failure of the shuttle to take up a hair a stoppage of the shedding apparatus and the cloth take-up will be effected.

Figure 1 is an end elevation, and Fig. 2 is a front view, of a loom. Figs. 3, 4, and 5 are views of the shuttle. Figs. 6, 7, and 8 are details of the hair-selecting and the stop apparatus.

Similar letters of reference indicate corresponding parts.

The picking motion, or the apparatus for moving the shuttle to and fro across the shed, and the mechanism for working the lay or batten are supposed in this instance to be constructed in the manner described in the specification of Letters Patent granted in England to James Lyall on the 26th day of March, 1868, No. 1,042. I wish, however, to observe that I do not intend to limit my invention to the combination of my improvements with the Lyall loom, as it may be applied to the loom patented in England by William Edward Newton on the 28th of March, 1860, No. 758, and to others.

a is the driving-shaft; *b*, the second-motion shaft; *c*, the warp-beam; *d*, the back-rest; *e*, the healds, which are raised by a jacquard and drawn down by weights. The jacquard is worked by a tappet acting on a lever, and a cord is connected to the lever for actuating the jacquard. *g* is the lay-bottom; *h*, the breast-beam, and *i* the taking-up beam, which is driven by the emery-roller i' and a positive taking-up motion of the ordinary description. The shuttle *k* (shown detached in Figs. 3, 4, and 5) rests upon and is carried to and fro across the shed by the shuttle-driver *l*, (see Fig. 2,) which travels in the lay-bottom, and to each end of which a cord is attached. These cords, after passing over suitable guide-pulleys, are carried around the pulley *m*, as described in Lyall's patent above referred to.

The shuttle is made with a pair of nippers at each end, each nipper consisting of a part of the shuttle, and the movable jaws. (Marked $n\ n^1$, respectively.)

At each end of the lay-bottom is fixed a trough or receptacle, $o\ o'$, containing the horse-hair or other material in short lengths, forming the weft of the fabric. The ends of the horse-hair project slightly beyond the inner end of the trough, and they are held together by a spring in the usual manner.

At each side of the loom is an apparatus for selecting a single hair out of the bunch and bringing it into position for being taken hold of by the nippers at the ends of the shuttle. This apparatus is shown detached in Figs. 6, 7, and 8, and it consists of a flat bar, $p\ p'$, which passes through a hole in the bottom of the lay and fits in the box $q\ q'$, secured to the lay.

To the upper end of each bar *p* is jointed a lever, *r*, the upper end of which is pressed against the point of the needle *s* by the spring r^2.

The upper end of the lever *r* and the point of the needle *s* constitute the selector, which is moved up and down with the bar *p* by the lever and bowl b^1 at the end of the shaft *b*, acting on the lever b^2, which vibrates on a stud fixed to the loom side.

To the outer end of the lever b^2 is jointed one end of the link b^3, the upper end of which is jointed to the lower end of the bar *p*, as shown in Fig. 1.

The lever and bowl b^1 at the opposite side of the loom are placed in the contrary direction, so as to act alternately on the bars $p\ p'$. By this arrangement every revolution of the second-motion shaft *b* causes each of the bars $p\ p'$ to move up and down in the guide-boxes $q\ q'$.

When the bar *p* rises the selector remains closed until the horizontal arm of the lever *r* comes in contact with the short arm of the tumbler-lever t, which is hinged to a bracket projecting upward from the guide-box q. The horizontal arm of the lever r being depressed by the short arm of the lever t lifts the point of the lever r off the needle s, and as soon as the horizontal arm of the lever r passes beyond the lever t the spring r^2 closes the selector to catch hold of a hair or other weft. The bar p then begins to descend, carrying with it the single length of weft selected.

As the bar p descends the arm of the lever r depresses the short arm of the tumbler-lever t, which then regains its original position by its own gravity.

To the upper end of the bar p is also fixed the inclined plate u, which, as the bar rises, actuates the weft-stop lever u^1, which is jointed to the same bracket as the lever t. This lever u^1 is hooked at one end, as shown in Fig. 8, to act, when the hair is absent, on the weft-stop motion, consisting of the bracket u^2, (see Fig. 1,) fixed to the loom side. In this bracket is supported a sliding rod, u^3, provided with a spring to draw the rod back when it has been pulled forward by the lever u^1.

To the rod u^3 is fixed one end of a cord, which, after passing around guide-pulleys, is connected to the driving-catch of the jacquard-cylinder. A similar cord is likewise connected to the weft-stop motion at the opposite side of the loom. Another cord, after passing over suitable guide-pulleys, is secured to the driving-catch of the taking-up ratchet-wheel. By this arrangement, when the hair or other weft is drawn down by the selector, the hook at the end of the lever u^1 is held by the hair clear of the pin in the rod u^3 during the beat-up of the lay; but if the hair or other weft be absent, the lever u^1, not being held by the weft, is drawn by the spring u^7 until it assumes the diagonal position shown in dots, Fig. 8. Consequently as the lay advances the hook of the lever u^1 carries with it the rod u^3, and the cord then lifts the catch off the jacquard-barrel and stops the shedding motion.

The other cord lifts the catch of the taking-up ratchet-wheel and stops the taking up. Thus, whenever the selector fails to draw down a hair or other weft at either side of the loom, both the shedding and taking-up motions are stopped.

To the lay-bottom g are fixed bushes, to guide the studs x x^1. These studs are connected to levers x^2, which are acted upon by cams on the shaft d.

The office of the studs x x^1 is to open the nippers on the shuttle alternately, to release the hair that has been drawn across the shed. To the lay-bottom are also jointed the tumbler-catches y y', which open the nippers for seizing the hair.

The mode of operation is as follows, and the drawing represents the parts in the positions they occupy when the shuttle is in the shed and is traveling from right to left, as shown by the arrow in Fig. 2: The movable jaw n^1 is now supposed to have hold of a hair, and is carrying it into the shed. When the shuttle is approaching the left-hand side of the loom the stud x is up, and the jaw n^1 comes in contact with and is pressed toward the body of the shuttle by it, thus opening the nipper and releasing the hair. As soon as the shuttle has carried the jaw n^1 beyond the stud x the spring n^3 (see Fig. 4) again closes it. The shuttle then continues its course until the movable jaw n comes in contact with and is opened by the tumbler-catch y, and at the moment that the shuttle completes its course from right to left the tail end of the jaw n has passed beyond the catch y. The spring n^3 then instantly closes the jaw n, which takes hold of the hair that has been drawn from the left-hand bunch of hairs by the selector, as above described. At the return traverse of the shuttle the tumbler-catch y allows the jaw n to pass without opening it; and as the stud x is then down, the jaw n holds the hair until the shuttle has passed a little behind the right-hand selvage of the fabric. The stud x^1, which is shown down in Fig. 2, is now raised, and as the shuttle is carried past it this stud opens the jaw n to liberate the hair which is thus left in the shed. When the shuttle approaches the right-hand-selector the jaw n^1 is opened by the tumbler-catch y', and the selected hair from the right-hand bunch is taken hold of in the manner above described.

These operations are repeated so long as the selectors draw down the hairs, and between each traverse of the shuttle the warp is crossed, and the lay beats up in the usual manner; but if either selector fails to bring down a hair, the shedding and the taking-up motions are arrested in the manner above described; but the other motions of the loom continue until the missing weft is supplied.

When desirable or necessary, the lengths of hair or other material may be supplied to the shuttle by an attendant at each side of the loom; and by dividing the warp longitudinally and forming the shed in each half alternately, horse-hair of half the width of the fabric may be used.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the studs x x^1 and catches y y' with the jaws of the shuttle, substantially as shown and described.

2. The combination, with the slide p, needle s, lever r, spring r^2, lever b^1 on shaft b, lever b^2, and link b^3 of the tumbler-lever t, all arranged and operating as shown and described.

3. The combination of the plate w, sliding bar p, and weft-selector with weft-stop lever u^1 and spring u^7, as and for the purpose shown and described.

W. S. LAYCOCK.

Witnesses:
T. T. HIBBERT,
G. J. ABBOT.