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W. RUSSELL.

APPARATUS FOR USE IN THE MANUFACTURE OF SCOTCH BONNETS, &c.

No. 245,224. Patented Aug. 2, 1881.

Fig. 1

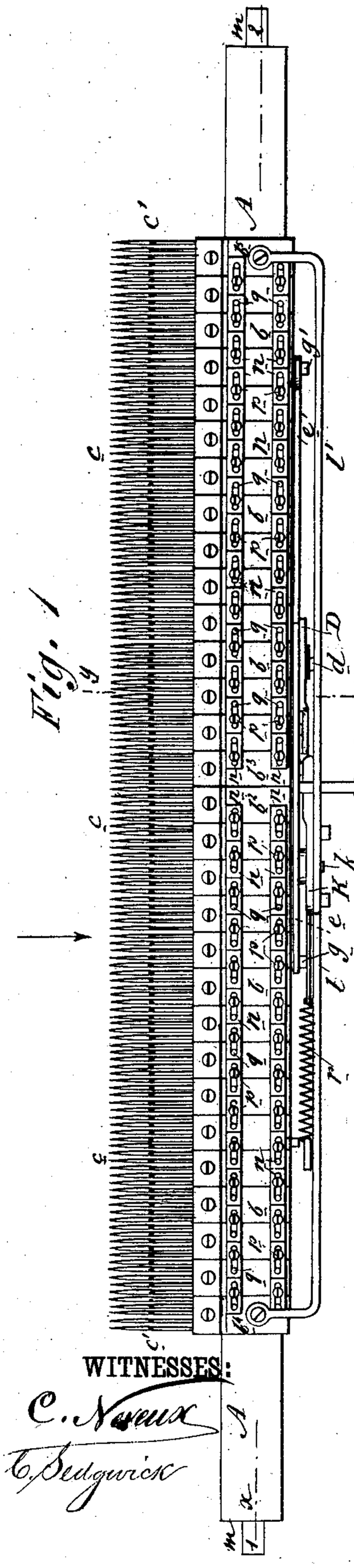

Fig. 2

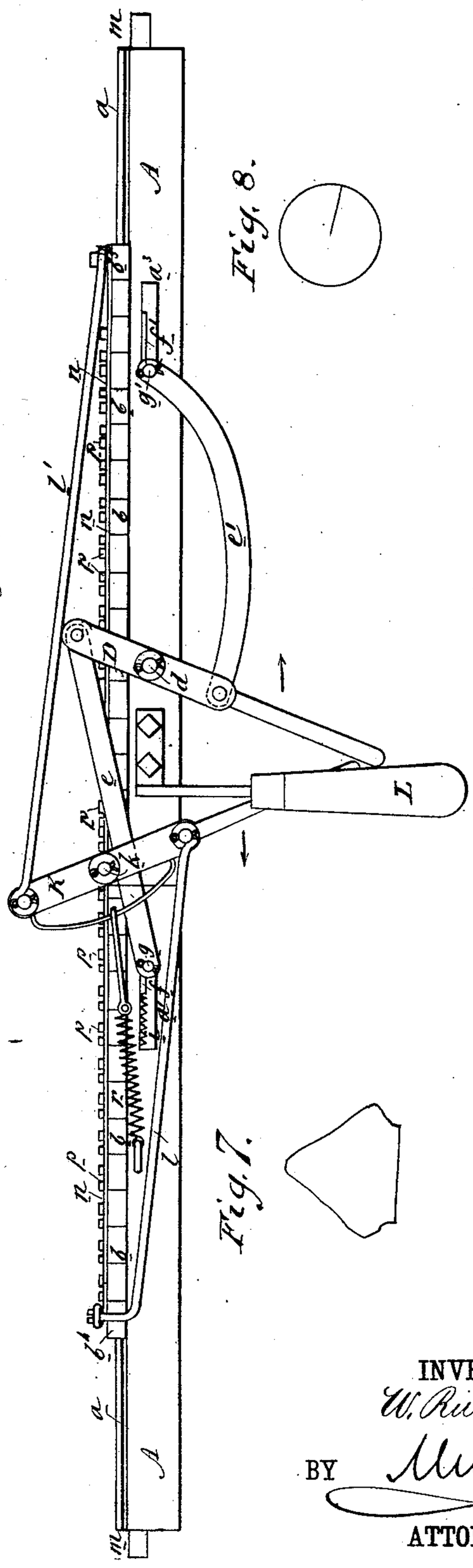

Fig. 8.

Fig. 7.

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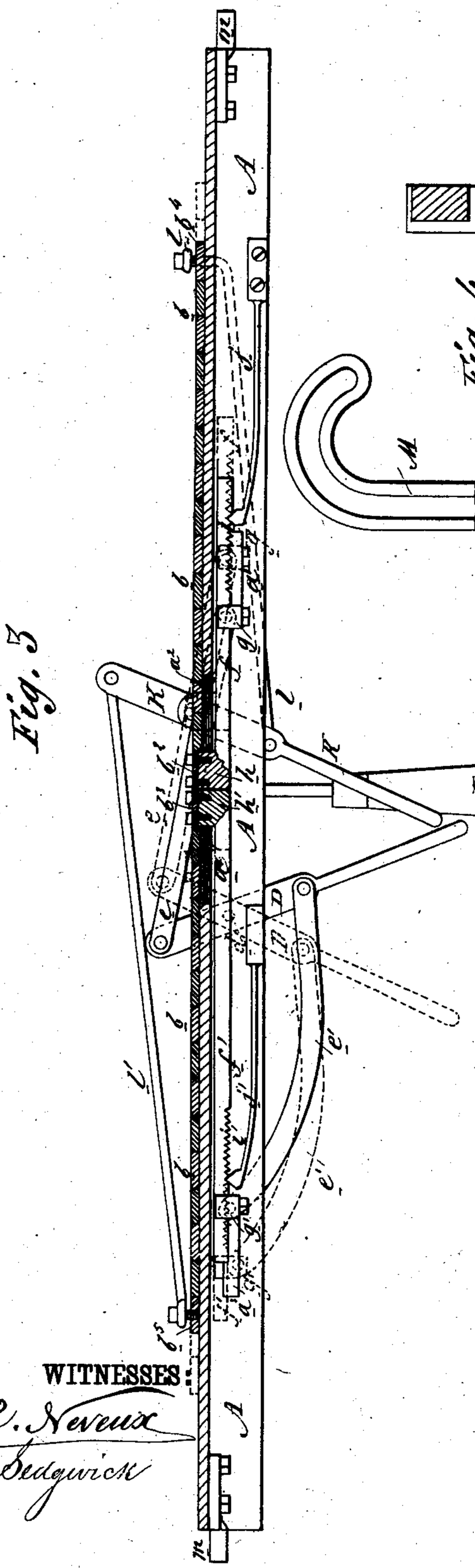

Fig. 3.

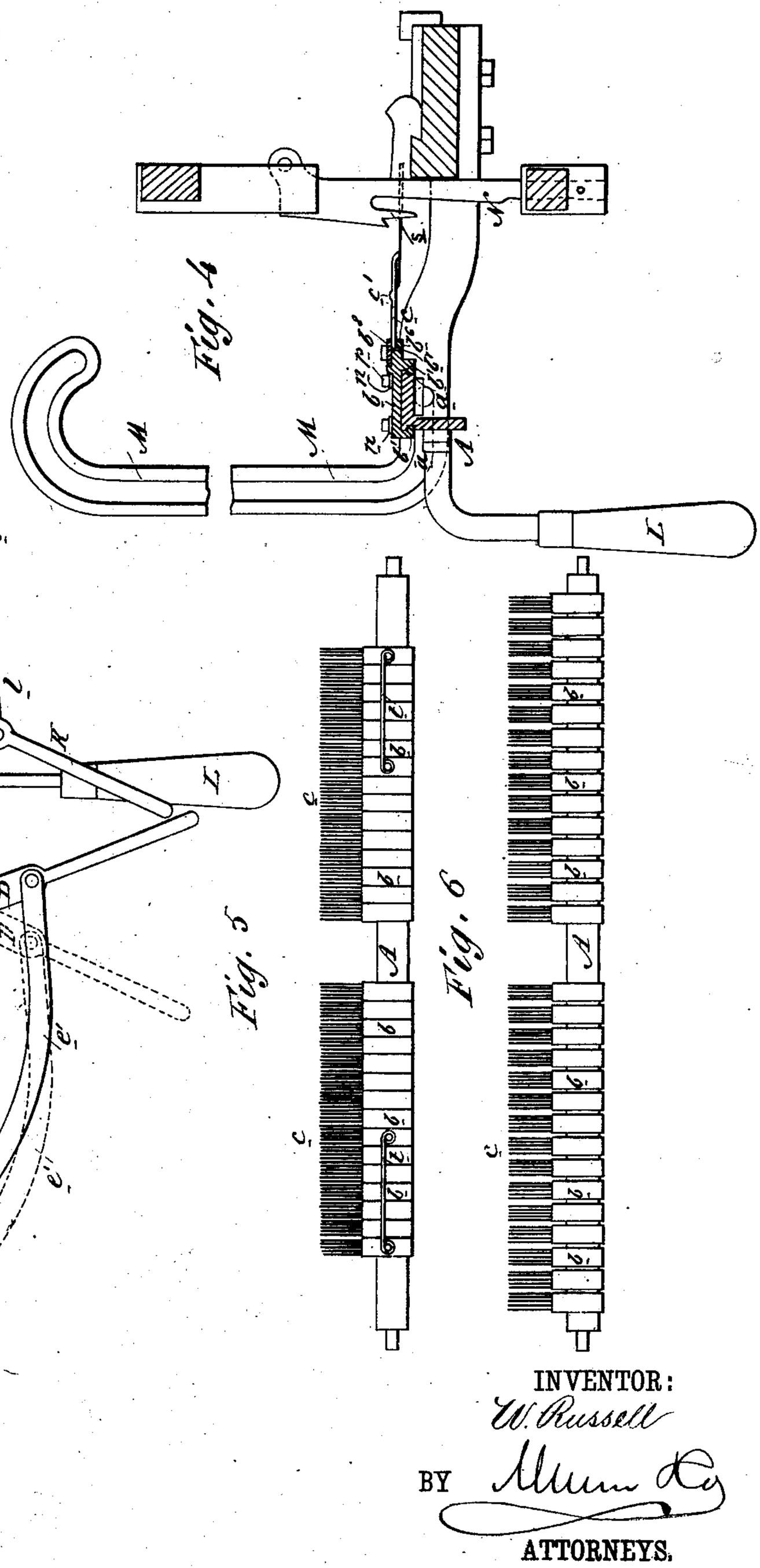

Fig. 4.

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM RUSSELL, OF KILMARNOCK, COUNTY OF AYR, NORTH BRITAIN.

APPARATUS FOR USE IN THE MANUFACTURE OF SCOTCH BONNETS, &c.

SPECIFICATION forming part of **Letters Patent No. 245,224, dated August 2, 1881.**

Application filed August 9, 1880. (No model.) Patented in England January 7, 1878.

To all whom it may concern:

Be it known that I, WILLIAM RUSSELL, of Kilmarnock, in the county of Ayr, North Britain, have invented a new and Improved Apparatus for Use in the Manufacture of Scotch Bonnets and the like, of which the following is a specification.

The object of this invention is to produce what are known as Scotch bonnets, hats, or other circular fabrics by machinery more expeditiously and of a finer quality than has hitherto been done.

The invention consists of an improved "jack" to fashion or shape knitted fabrics while being woven or knitted by a straight-bar hosiery-frame into circular-shaped fabrics.

Figure 1 is a plan of the jack. Fig. 2 is a front elevation of the same. Fig. 3 is a longitudinal section of the same on line *x x*, Fig. 1, looking in the direction of the arrow. Fig. 4 is a vertical sectional elevation on line *y y*, Fig. 1, showing the parts in operative connection with part of a straight-knitting machine. Fig. 5 is a plan view of the angle-bar of a jack with holders and "ticklers" in place, the latter being slid one-half in either direction from the center line of the length of the jack. Fig. 6 is a plan view of the angle-bar of the jack with holders slid apart. Fig. 7 shows the form of the piece of fabric designed for a Scotch bonnet as it leaves the stocking-frame. Fig. 8 is a plan of a Scotch bonnet, showing the position of the joint running from the center of the crown to the selvage.

Similar letters of reference indicate corresponding parts.

In order to make a knitted hat, cap, or bonnet upon a common hosiery-frame operated either by hand or power, the sinkers of said frame require to be so made and so adapted that the frame will give a larger loop than a frame making hosiery only. The loop or united stitch is the same in every other respect as the loop or stitch formed in making a stocking or any other hosiery fabric.

In order to hold the sinkers firmly or to keep them at regular distances from each other and to suit the application of the jack, a brass rivet is put through the tail of each lead sinker, as shown in Fig. 4, said rivet to correspond with the gage of the frame.

The jack-machine is used in combination with the straight-bar hosiery-frame for the purpose of narrowing or widening the fabric under course of manufacture by reducing or increasing the number of stitches in any particular course or courses of the said fabric in such a manner that the reductions or increments are or may be distributed equally through the fabric, the said improvements rendering the jack capable of ready and efficient operation and application to effect the said narrowing and widening of the fabric.

The jack consists of a framing or angle bar, A, in grooves *a* in which slide tickler-holders *b*, as seen more clearly in Fig. 4, the operating mechanism being omitted, the said holders *b* being formed with webs or projecting ribs *b'* to engage in the said grooves *a*. Each of the said holders *b* is furnished with a number (in this instance with five) of ticklers or points, *c*, which are secured in said holders at a distance apart corresponding to the distance from each other of the needles of the hosiery-frame with which the improved jack is to be used, and so that the ticklers of all the holders, when close together upon the bar A, will be at equal distances apart. The ticklers *c* may be secured in the holders *b* by soldering them thereto, or by bending their ends down at right angles, so that part of the ticklers *c* may lie in horizontal slots b^6, their bent-down ends being passed into vertical holes b^7, and all the ticklers *c* of each holder *b* being secured by a plate, b^8, screwed down over them, as shown in Fig. 4. Each tickler *c* has a projection, *c'*, on its back, which projection is for the purpose of preventing the loops of the fabric under course of manufacture from being slipped too far back when cast off from the needles of the hosiery-frame onto the ticklers *c* of the jack, as hereinafter explained.

The holders *b* are capable of being slid, the half of them in one direction from the center line of the length of the jack and the other half in the other direction from the said center line, as shown in Fig. 5 and as indicated in dotted lines in Fig. 3, this being effected by means of a lever, D, turning upon a stud, *d*, the said lever D having arms *e e'* connected to it at equal distances on either side from the stud *d*, the arm *e* being attached at its other end to a bar, *f*, by a pin, *g*, passing through and guided by a slot, *a'*, in the bar A, the said

bar *f* extending to the center of the jack, and terminating in a projection or swell, *h*, which projects through and runs in a slot, a^2, in the bar A, and to which projection *h* is screwed the innermost holder b^2 of those holders *b* which are to one side of the center line of the jack. The other rod, *c'*, is similarly connected to a bar, *f'*, by a pin, *g'*, passing through and guided by a slot, a^3, in the bar A, the said bar *f'* extending to the center of the jack, and terminating in a projection or swell, *h'*, projecting through and running in a slot, a^4, in the bar A, to which projection *h'* is secured the innermost holder b^3 of those holders *b* which are to the other side of the center line of the jack.

On the under side or edge of each of the bars *f f'* is a series of notches, forming racks *i i'*, with which engage springs *j j'* to retain the bars *f f'* in the position to which they may be brought.

The holders *b* are capable of being slid along the bar A, close up to each other, toward the center line of the jack, so that the end ticklers of any one holder *b* are at a distance from the end ticklers of the holders on either side of it equal to the width between two adjacent needles of the hosiery-frame, as shown in Fig. 5. The said holders *b* are also capable of being opened out from each other—that is, slid along the bar A away from the center line of the jack—the holders on one side of the center line of the jack in one direction and those on the other side of the center line in the other direction, so that the end ticklers of any one holder *b* are at a distance from the end ticklers of the holders on either side of it equal to double the width between two adjacent needles of the hosiery-frame, as shown in Fig. 6. These motions are effected by means of the lever K turning upon a stud, *k*, the said lever K having connected to it at either side of its center the ends of rods *l l'*, the rod *l* being fastened at its other end to the outermost holder b^4 at one end of the jack, and the rod *l'* being similarly connected to the outermost holder b^5 at the other end of the jack. The holders *b* of each series on either side of the center line of the jack are coupled together by slotted links *n*, each link being secured to the holders *b* by screws *p*, and projecting over the next holder. Projections *q* on the holders engage in the slots of these links *n*, which slots are of such length that the said projections *q* prevent the holders *b* from being separated from each other to a greater distance than that explained with regard to Fig. 6. Plates, stops, or bolts may be substituted for links to permit the same application.

The spring *r* is for holding the lever K, and consequently the holders *b*, steady in any position to which they may be brought.

The jack is provided with a handle, L, by which it is held when in use, and at either end of said jack are projections *m*, by which the jack is supported in slotted guides M, Fig. 4, attached to the hosiery-frame, at either side thereof, so that the said jack may be raised in the vertical slots of the said guides and rested in the upper part thereof when not in use, and brought down into the horizontal slots into position for work, as shown in Fig. 4.

In manufacturing a Scotch bonnet in a hosiery-frame with which is combined a jack constructed according to my invention, the loops are cast onto the frame in any ordinary way, and a number of courses, depending upon the size and shape of bonnet to be manufactured, are worked in the ordinary way, the jack in the meanwhile remaining turned up out of the way, resting in the upper part of the brackets M.

When the fabric is to be widened this is done with the improved jack in the following manner: The jack is lowered and slid along the horizontal grooves of the brackets M, and the ticklers are brought into such a position by means of the lever D that each tickler overlaps the beard of each needle, as seen in Fig. 4, a small space being left in the center of the jack—that is, between the series of tickler-holders on either side of the center line of the jack—as shown in Fig. 5, by sliding them away from each other by means of the lever D. The frame is then worked so that the sinkers N, Fig. 4, come forward, and the belly thereof urges the loops from the needles of the frame onto the ticklers. The jack, with the loops upon its ticklers, is then drawn back from the needles and the tickler-holders *b* are opened out from each other by means of the lever K into the position shown in Fig. 6. The jack is then again brought into the position shown in Fig. 4, and the frame being worked, the part *s* of the sinkers takes the loops from the ticklers onto the needles. Thus each needle, with the exception of every fifth one—*i. e.*, that between the holders *b*—has a loop upon it. To form a loop upon these vacant needles a part of the loop from the adjacent needle is brought over it, or one course is worked, and the threads passing over the vacant needles are brought down and passed through the previously-worked course and up over the needles by means of a turning-hook. The number of the stitches is thus increased, and consequently the fabric is widened. The number of courses which may be desired are then worked with the fabric thus widened, the jack in the meantime being supported out of the way in the upper part of the brackets M.

When it is desired to narrow the fabric the jack is brought down, and by means of the lever K the holders *b* are slid apart, as shown in Fig. 6. The ticklers are then placed over the needles of the frame, as in Fig. 4, the said ticklers being brought into proper position by means of the lever D, and the loops from the said frame are urged, as before described, from the needles onto the ticklers, one loop being left on each needle which is opposite the spaces between the tickler-holders. The jack is now drawn back and the lever D is moved so that the holders *b* are all brought the width

of one needle toward the center of the jack, the notches of the racks *i i'* being such a width apart that they correspond to the width between two adjacent needles. The ticklers are again brought over the needles, and, as before described, the frame is worked so that the part *s* of the sinkers takes the loops from the ticklers onto the needles. Thus those needles upon which loops were left receive another loop, and those needles which are opposite the spaces between the holders *b* in their present position are without loops. The loops are then again passed onto the ticklers, as before described. The jack is then drawn back and the holders *b* are brought close together, as shown in Fig. 5, by means of the lever K. The jack is then again brought into the position shown in Fig. 4 and the loops are brought onto the needles, as before explained, when every fifth needle will have a double loop upon it. The jack being brought back is slid up and supported in the upper part of the brackets M. On working the next course with the frame the double loops have one loop worked into them, and the stitches being thereby lessened, the fabric is narrowed.

Where it is desired that the fabric be widened at parts toward the center and not toward the edge, I employ a catch or device similar to that shown at *t* in Fig. 5, by which any desired number of the outer holders *b* are held together and prevented from being opened out from each other, and consequently the parts of the fabric corresponding in position to the holders thus held together are not widened.

I have described my improved jack as adapted to a straight-bar hosiery-frame; but it will be evident that it may also be adapted for use with a curved frame by making the bar A of the jack of a curve to correspond with the frame, the holders *b* being of a shape to slide upon this curved bar. The holders *b* may contain a greater or less number of ticklers than that shown.

By the use of this improved jack the narrowing or widening of the fabrics is effected with great facility, and is equally distributed throughout the fabric from the center thereof.

To make what is commonly known by cap-manufacturers as an "Alma," or driving cap, I take a common straight-bar hosiery-frame, as already described, and I start on the peak, beginning on or about the center of the frame, by casting loops onto about twenty leads of needles, and after working two courses I widen one needle each side by simply laying the thread over the extra needle as the course is being wrought, and continue so until the peak covers about forty leads of needles, according to the size of peak wanted. I then cast loops onto the empty needles each side of the peak, filling all the needles with loops that I wish, according to the size of the bonnet or hat, then work about twenty courses and bring down the jack and perform the operation of widening, as already described; work about twenty courses more and again bring down the jack, and this time perform the operation of narrowing, as already described. Then I work about eight more courses and bring the jack into operation to narrow, and repeat the same operation of working a few courses after each operation of the jack in narrowing, reducing the number of courses to be wrought between until the fabric or crown of the bonnet is circled into a circle or point. It is then turned off the frame, and resembles the piece shown in Fig. 7, and after being seamed, as shown in Fig. 8, it is ready for being milled, lined, and finished in the customary manner.

In defining my invention more clearly, I would state that I am aware that a jack has been constructed for the same purpose in which the points or ticklers were hung upon an axis and were individually movable in a vertical plane to permit a portion of them to be thrown out, as in English Patent 684 of 1872, and that groups of points or ticklers have been arranged to slide horizontally and laterally on a jack. In the latter case, however, the groups of ticklers were arranged alternately on two bars and an independent connection required for each. My invention differs from these in that the plates *b*, carrying the groups of ticklers *c*, are arranged all on the same bar A and have a loose lateral drag-connection through the links, which permits the same to occupy the position shown in Figs. 5 and 6 for widening or narrowing the fabric, as described.

What I claim as new, and desire to secure by Letters Patent, is—

1. The jack herein described, consisting of the combination of a single bar, A, the laterally-sliding plates *b*, carrying the ticklers, the links *n*, forming a loose drag-connection, and mechanism adapted for hand operation, substantantially as described.

2. The combination of the single bar A, the tickler-plates *b*, capable of being slid thereon, the links for loose drag-connection in lateral direction, a lever, K, with rods *l* and *l'*, connected to the outer plates of the two series, and the lever D, with rods *e e'* and bars connecting with the inner end plates of the two series, substantially as shown and described.

3. The combination, with the bar A, the laterally-adjustable plates *b*, provided with the ticklers, and means for affording a loose drag-connection, as described, of the tie-links *t*, for holding a number of said plates while the others are being adjusted, substantially as described.

WILLIAM RUSSELL.

Witnesses:

JOHN PATON TURNBULL,
Manufacturer, *Kilmarnock.*

HUGH GALT,
Cap-manufacturer, *Kilmarnock.*