

C. H. PLATT & G. A. STANBERRY.

Knitting-Machines.

No. 151,716.

Patented June 9, 1874.

FIG. I.

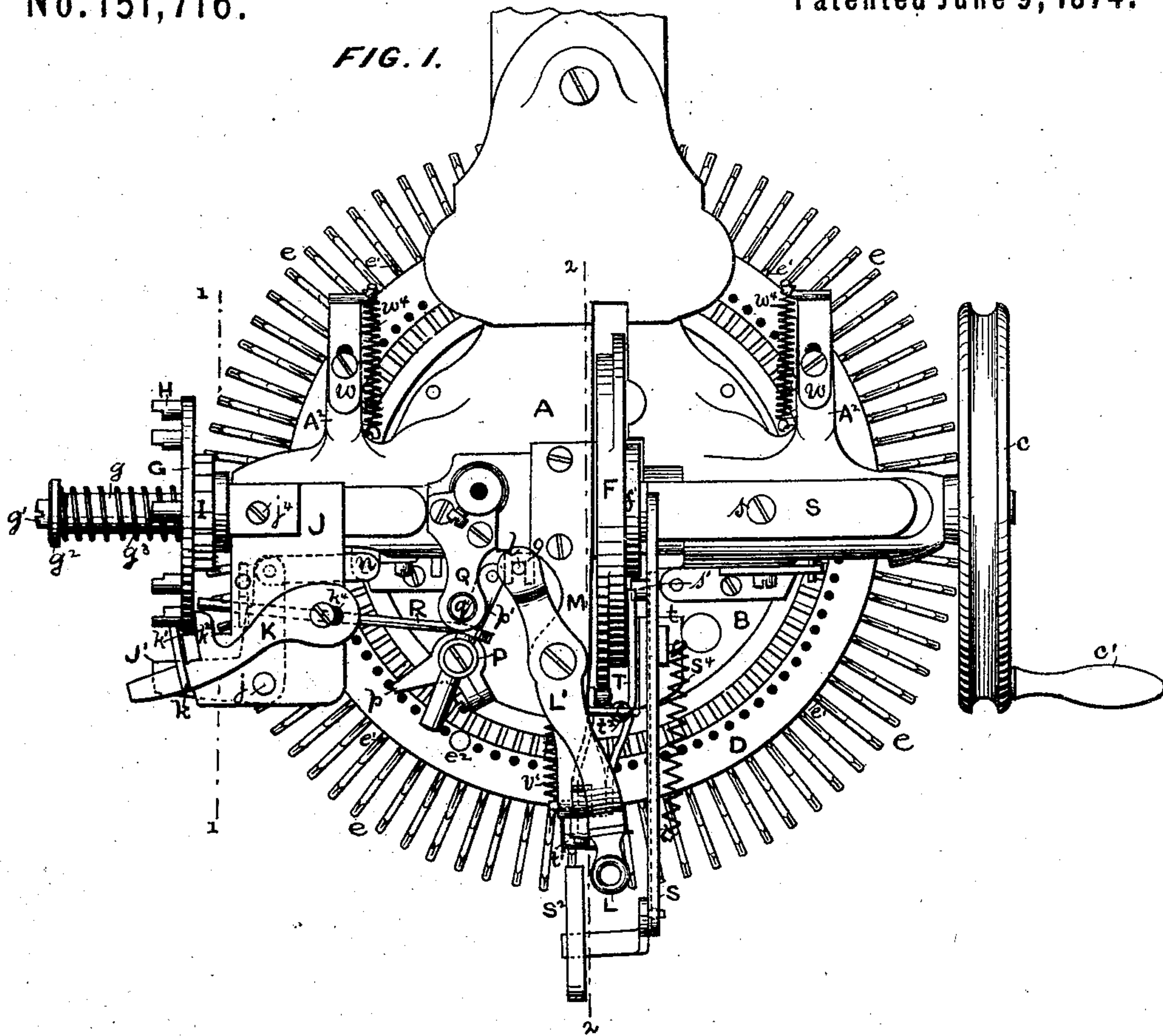
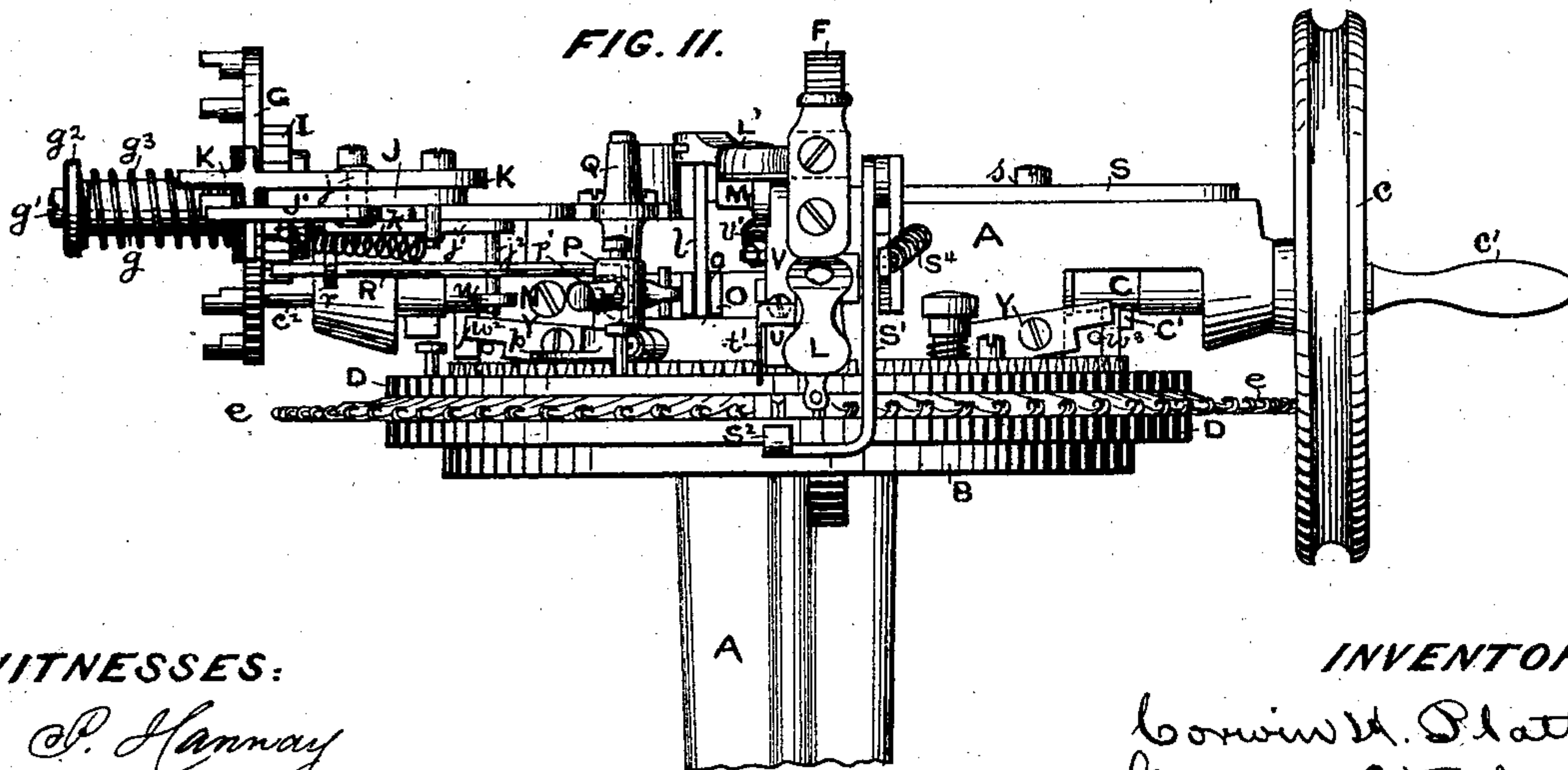


FIG. II.



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CORWIN H. PLATT AND GEORGE A. STANBERY, OF NORWALK, OHIO.

IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. 151,716, dated June 9, 1874; application filed April 25, 1874.

To all whom it may concern:

Be it known that we, CORWIN H. PLATT and GEORGE A. STANBERY, of Norwalk, in the county of Huron and State of Ohio, have invented certain new and useful Improvements in Knitting-Machines; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in knitting-machines, more particularly to an attachment for knitting fancy-work automatically, said attachment being adapted for use in connection with our improved knitting-machine heretofore patented. The invention consists in the attachment of a pin-wheel of peculiar construction, operated by means of an eccentrically-operating pin or rod on the end of the driving-shaft, the pin on the shaft engaging with a ratchet-wheel secured to the aforesaid pin-wheel, so as to cause the latter to revolve a certain distance with each revolution of the driving-shaft, whereby, through the pins on the wheel, and the operation of connecting mechanism, the yarn-carrier and needle-rings are reversed at each revolution of the driving-shaft, so as to knit on two needles only, the pins on the pin-wheel being removable, so that they may be arranged in different combinations, with relation to each other and to the blank spaces between them, and operate to reverse the yarn-carrier and needle-rings, so as to knit on two needles a given number of stitches, then gain one or more stitches, and again knit a given number on two needles, whereby a great number and variety of fancy patterns may be knitted. Further, it consists in a combination of devices whereby the pin-wheel attachment is automatically thrown out of gear, when the end of the web is reached with the fancy knitting, and the needle-rings and yarn-carrier reversed, so as to permit the machine to knit back plain across the web, and then be again thrown into gear to work the fancy stitch. It also consists in a device, to be used in connection with our pin-wheel attachment, which

throws the loop below the end of the needle; and, also, in a device for picking up and replacing the loop on the notch of the needle when it slips down from the notch into the hook of the needle, all as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a plan view of our improved knitting-machine having our fancy-knitting attachment. Fig. 2 is an elevation of the same. Fig. 3 is a vertical sectional view on the line 1 1, Fig. 1, with the pin-wheel attachment removed. Fig. 4 is a vertical sectional view on the line 2 2, Fig. 1. Fig. 5 is an end view, showing the face of the pin-wheel and its connection. Fig. 6 shows the back or other side of the pin-wheel. Fig. 7 is a side elevation of the pin-wheel.

Before describing the peculiar construction and operation of our fancy-knitting attachment, we will first briefly describe the general construction and operation of our improved knitting-machine, in order to enable those skilled in the art to more fully understand our present invention, reference being had to Letters Patent No. 137,568, of date April 8, 1873, for a more full and particular description of said knitting-machine.

The stationary parts consist of frame A and circular base-plate or disk B, securely united together. The driving-shaft C is journaled in frame A, and operated by a band-wheel, *c*, or handle *c*¹. The needle-rings D are seated on the disk B, and are made to rotate in either direction by a toothed feather, *C'*, seated in a slot on the shaft, and operated as hereinafter more fully set forth. The needles *e* are operated, one at a time, by means of a needle-carrier, E, which reciprocates back and forth in a groove cut in the base-plate, movement being imparted to the needle-carrier by means of a cam-groove on the wheel F and a friction-roller, *f*. These reciprocating needles operate in connection with the stationary comb-teeth or strippers *e*, and the operation of knitting is accomplished by the needle-carrier first drawing back the needle, and then pushing it forward again. As the needle retreats the loop previously formed on it is taken up by the comb-tooth or stripper, the point of the latter projecting into a longitudinal groove formed on the upper side of the needle for that pur-

pose. The old loop is retained on the stripper by a suitable device, while the needle, continuing its backward course, draws the yarn through the old loop, thereby forming a new one. As the needle returns the old loop is liberated and pushed from off the tooth by the point of the needle, and passed under it to form the web, while the needle continues its forward course, and the new loop is placed on the point of the tooth, or in position to be transferred to it when again operated.

Having thus given a general idea of our improved knitting-machine, we will now proceed to describe our present invention, to wit, the fancy-knitting attachment and the different devices operating in connection therewith.

Referring to the parts by letters, G represents a pin-wheel, having an elongated journal or sleeve, g , loosely mounted on a spindle, g^1 , which projects from a supporting plate or frame, J, secured to the frame A, the spindle being placed above and in a line with the driving-shaft c . On the end of this spindle g^1 is a fixed disk or ring, g^2 . g^3 is a spiral spring surrounding the sleeve or journal g , one end resting against the disk g^2 and the other against the face of the pin-wheel G. This spring holds the pin-wheel in proper working position when in gear, permits it to be moved sidewise or pressed outward on the spindle, to be thrown out of gear, and brings it back into gear again when the pressure is removed. The outer edge of the wheel G is pierced with a number of holes, h . In the wheel shown in the drawings these holes are fifteen in number, but we do not limit ourselves to any particular number of holes or to a wheel of any specific diameter. H represents removable pins inserted in some of the holes h , their ends projecting outwardly therefrom. As shown in the drawings, they are seven in number, and inserted in the holes 1, 3, 5, 7, 9, 11, and 13, respectively, this particular arrangement being made to secure a particular pattern of fancy knitting; but, as will be hereinafter more fully explained, the number of pins and their relative arrangement may be varied at pleasure, or according as different patterns of fancy knitting are required to be worked. On the opposite side of the pin-wheel is a ratchet-wheel, I, having teeth corresponding in number to the number of pin-holes, one tooth, i , being partially cut away. This ratchet-wheel forms part of, or is rigidly secured to, the pin-wheel G, and revolves with it. e^2 is a pin or rod secured eccentrically to the ends of the driving-shaft C, and projecting therefrom, so as to come in contact with the teeth of the ratchet-wheel I as the shaft revolves, and thereby cause the pin-wheel to revolve a stated distance with every revolution of the shaft so long as the pin e^2 gears with the ratchet-wheel. J is the supporting frame-plate of the attachment, secured to the frame A, and projecting at right angles therefrom. J' is a two-armed lever, pivoted, at j , to the plate J. Its inner arm connects with one end of a rod, j^1 , the other end of which

carries a pendent rod, j^2 . The other arm of the lever J' fits into a slot formed in a cam-plate, k , which is secured to the outer end of a single-armed cam-lever, K. This cam-lever K is also pivoted to the frame-plate J, the pivot-bolt passing through an elongated bolt-hole, k^4 . It is also provided with a notch, k^1 , between the cam-plate k and a projection, k^2 , to receive the edge of the pin-wheel, which revolves through the notch. k^3 is a spiral spring, one end of which is secured to the frame-plate J, and the other to the free end of the lever J'. The pin-wheel and the devices just described are all attached to the frame-plate J, and constitute our fancy-knitting attachment proper. It is attached to the knitting-machine by a screw, j^4 , so that it can be removed at pleasure. L is the yarn-carrier, secured on the outer end of a lever, L', which is pivoted to an arm, M, secured to the frame A. The inner end of the lever L' carries a pendent rod, l . N is a sleeve on the shaft C, on the inner end of which is a cam-groove, which permits a tooth or projection on the feather C' to turn freely therein while the machine is operating in one direction. It has a projecting loop or eye, n , through which the pendent rod j^2 of the rod j^1 is passed. The motion imparted to the lever J' by the pins on the wheel G causes the sleeve N to slide back and forth on the shaft C, and carry the feather with it, reversing the direction of the needle-rings, as hereinafter more fully set forth. O is another sleeve, which slides back and forth on the shaft C. It has a projecting slotted arm, o , through which the pendent rod l of the yarn-carrier passes, so that when the sleeve O slides on the shaft through the operation of the sleeve N and feather C', it causes the yarn-carrier to reverse.

It will thus be seen that when the pin-wheel is in gear with the shaft C, the cam-lever J' and sleeves N and O will reverse the yarn-carrier and the direction of the needle-rings at each revolution of the shaft C, and cause the machine to knit on two needles only. It will also be obvious that if the cam-lever J' is not operated by the pins on the pin-wheel the needle-rings will continue to operate in one direction, and each needle will be operated in succession. Therefore, by leaving the holes numbered 14 and 15 without pins, the cam-lever rests a space at that point, and permits the needle-rings to move the distance of one needle without reversing, and in this way we remove the operation of knitting from the first and second to the second and third needles, and gain a needle at each revolution of the pin-wheel.

P is a vertical shaft, journaled in the base-plate B, having an arm, p , which overhangs the pin-holes of the needle, so that when the reversing-pins e^2 are inserted they will come in contact with it. p' is a horizontal arm or reversing-lever, also secured to the upright or vertical shaft P. Its inner end engages with the sleeve N, and has a vertical pin passed

through a slot in said sleeve to keep it in position. A portion of the upper side of this arm p' is also cut away like a knife-edge bearing. Q is an arm secured to the frame A, and projecting therefrom, its outer end being formed into a vertical sleeve, which holds a spring-shaft, q . When the reversing-pin e^2 comes in contact with the arm p it causes the shaft P to turn, and the arm p' , moving with it, slides the sleeve N on the shaft C, and thereby, through the feather and sleeve O, reverses the yarn-carrier and the direction of the needle-rings without the aid of the pin-wheel and its connections. R is a rod, one end of which is attached to the reversing-lever p' , and the other passed through a pendant or loop, r , secured to the under side of the frame J toward the wheel G. When the shaft P is turned by contact with the reversing-pin this rod R will be pushed out, and its end coming in contact with the pin-wheel G, the latter will be forced outward on the spindle g^1 . It will be obvious that if this movement occurs when the cut-away tooth of the ratchet is next to the eccentric pin e^1 on the shaft, the pin-wheel G will be thrown out of gear and the machine knit straight back, each needle once in its turn, until the shaft P is again turned by the other reversing-pin, e^2 , and the pin-wheel again brought into gear by the action of the spiral spring g^3 . S is an arm or frame-plate secured to the frame A, at s , one end of which projects therefrom at right angles, and overhangs the needle-ring. S^1 is a pendent lever, pivoted to the outer end of this arm S, its lower or free end being bent outwardly, as shown in the drawings, and provided with a spring-bar, S^2 , bent upward, and projecting inwardly toward the needle-rings, and immediately beneath the needles. A reciprocating motion is imparted to this lever S^1 and spring-bar S^2 by means of a connecting-rod, S^3 , the inner end of which is provided with a friction-pulley, s' , which engages with a cam-disk, f' , on the wheel F, and a spiral spring, S^4 , one end of which is attached to the connecting-rod S^3 , and the other to the frame S, as clearly shown by Fig. 4 of the drawings.

This device operates in connection with the needles to replace the loop back on the notch whenever it slips down from the notch into the hook, which the loops are more apt to do when the knitting is performed on two needles through the operation of our new fancy-work attachment. T is a lever, pivoted to a plate, t , secured to the base-plate B. The outer end of this lever T projects downward, its extremity being formed into a bifurcated foot, t^2 . An up-and-down motion is imparted to this foot by means of a pin projecting from the side of the cam-wheel F, which comes in contact with the inner end of the lever, lifting it up and depressing the foot end. A spiral spring, t^2 , one end of which is secured to the lever and the other to the arm M, raises the foot again, and keeps it up until again depressed by the pin on the wheel F.

The object of this device is to throw the loop below the end or point of the needle as the needle removes it from the comb-tooth or stripper. This device we call the sinker.

U represents the stitch-retainer, secured to the lower end of a rocking arm, V, which is pivoted to the arm M. It is arranged to operate between the bifurcated ends of the sinker or foot t^1 , and an oscillating or vibrating motion is imparted to it by means of an arm, v , having a friction-pulley on its end, which is brought in contact with a cam on the rim of the wheel F, and a spiral spring, v' , one end of which is attached to the rocking arm V, and the other to the arm M.

The object of this device is to hold the loop on the comb-tooth while the needle, in its backward course, draws the yarn through it.

W are levers, one on each side of the machine, the rear ends of which are bifurcated or slotted, and pivoted to brackets A^2 , which form part of the frame A, by a pin which passes transversely through the brackets and the slot of the lever. w is an angle-plate secured to the frame A^2 by a screw passed through a long slot formed in the horizontal arm thereof. w^1 is a rubber block secured on the inner sides of the vertical arm of the angle-plate, with which the rear end of the lever W comes in contact. The upper forward ends of these levers W are arc-shaped, and on their under side are provided with a cog or tooth, w^2 . They are also provided with pins or rods w^3 , which project beyond their forward ends, so as to come in contact with the notched plates Y, secured to the frame A. w^4 are spiral springs, secured at one end to the lever W, and to the angle-plate at the other.

The object of this device is to communicate motion from the driving-shaft to the needle-rings, the teeth or cogs on the feather being so arranged and operated as to depress the levers W at the proper moment and bring the tooth w^2 into gear with the teeth or cogs of the needle-rings. The spiral springs w^4 raise them out of gear as soon as relieved from the pressure of the cogs on the feather. The dotted line Z, Fig. 3, shows the course of the yarn through the yarn-carrier. The devices for supporting the bobbin are secured to the frame A, and the bobbin is secured thereto by devices which regulate the tension; but these devices are not shown in the drawings, and are not claimed in the present application, which is confined to our fancy-knitting attachment and the herein-described devices operating in connection therewith.

Having thus described the mechanical construction and operation of the devices for producing our new fancy-knitted fabric, we will now proceed to describe the operation whereby said fabric is knitted on the machine with the special arrangement of the pins on the pin-wheel shown in the drawings.

We first set up plain loops on fourteen of the needles, and arrange the reversing-pins so as to reverse when either end of the web is

reached. We then commence to knit at the right-hand side or end of these fourteen needles, the pin-wheel and its connecting mechanism being arranged as herein shown and described. The machine is then set in motion, and the first two needles knit fourteen times, the yarn-carrier and needle-rings reversing at each revolution of the driving-shaft, until the pin-wheel revolves to hole No. 14, when, there being no pin in hole 15, the needle-rings will rotate the distance of one needle without reversing, thereby gaining a needle. The work will then be continued on the second and third instead of on the first and second needles, the second and third being knitted fourteen times, as were the first and second, and so on across the whole web. When the last of the series are knitted, the reversing-pin comes in contact with the arm *p*, and, as before described, turns the shaft *P* and the reversing-lever *p'* at the same time, moving the rod *R* outward, and pushing the pin-wheel outward on the spindle *g*¹, so as to throw it out of gear at the point where the tooth of the ratchet-wheel is partially cut away. The eccentric pin *e*² on the driving-shaft will then revolve without coming in contact with the ratchet, and the pin-wheel remains at rest. The machine being thus reversed and the pin-wheel thrown out of gear, it will now knit straight back across the web without reversing until it reaches the right-hand end of the web or place of beginning, and in this way the rows of loops of the fabric previously formed are bound together. The other reversing-pin is then in contact with the arm *p*, and again operates the reversing-lever, drawing back the push-bar *R*, and allowing the pin-wheel to come again into gear at the proper starting-point through the action of the spiral spring *g*³. The operation then proceeds as before, and in this way the fancy-knitted fabric is produced automatically, and by the continuous motion of the driving-shaft turning in one direction.

The pattern of the fabric may be varied by altering the position of the pins on the wheel, and in arranging them in different combinations with relation to the spaces left between the pins, as will be obvious to those skilled in the art. It will also be obvious that the width

of the fabric may be varied and widened or narrowed, as desired.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. As an attachment to knitting-machines, the pin-wheel *G*, constructed as described, receiving motion from the driving-shaft, and reversing the needle-ring and yarn carrier at each revolution of the shaft by means of a cam-lever, *k*, lever *J'*, rod *j*¹, and sleeve *N*, substantially as and for the purpose specified.

2. The pin-wheel *G*, having the ratchet *I* and cut tooth *i'*, and operating in connection with a spring, *g*³, push-rod *R*, and reversing-lever *p'*, substantially as and for the purpose specified.

3. The combination of the pin-wheel *G*, cam-lever *K*, lever *J'*, rod *j*¹, and sleeves *N* and *O* with the shaft *C* and feather *C'*, substantially as and for the purpose specified.

4. The combination of the pin-wheel *G*, levers *K* and *J'*, rod *j*¹, sleeve *N*, shaft *C*, and feather *C'* with the levers *W*, substantially as and for the purpose specified.

5. In connection with the pin-wheel *G* and its operating mechanisms, the sinker *t*¹, operated by means of the wheel *F*, lever *T*, and spring *t*², to throw the loop below the point of the needle, substantially as herein set forth.

6. In connection with the pin-wheel *G* and its operating mechanisms, the pick-up or loop-replacer *S*², operated by means of the lever *S*¹, rod *S*³, friction-wheel *S*¹, cam *f'*, and spring *S*⁴, substantially as and for the purpose specified.

7. The combination of the sinker *t*¹, operated as described, with the stitch-retainer *U*, receiving motion from the cam-wheel *F* by means of the lever *v* and spring *v'*, substantially as and for the purpose specified.

8. The levers *W*, constructed substantially as described, and arranged to operate, with the toothed feather *C'*, shaft *C*, and needle-ring *D*, substantially as and for the purpose specified.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

CORWIN H. PLATT.

Witnesses: GEORGE A. STANBERY.

N. M. PLATT,

GEO. Q. ADAMS.