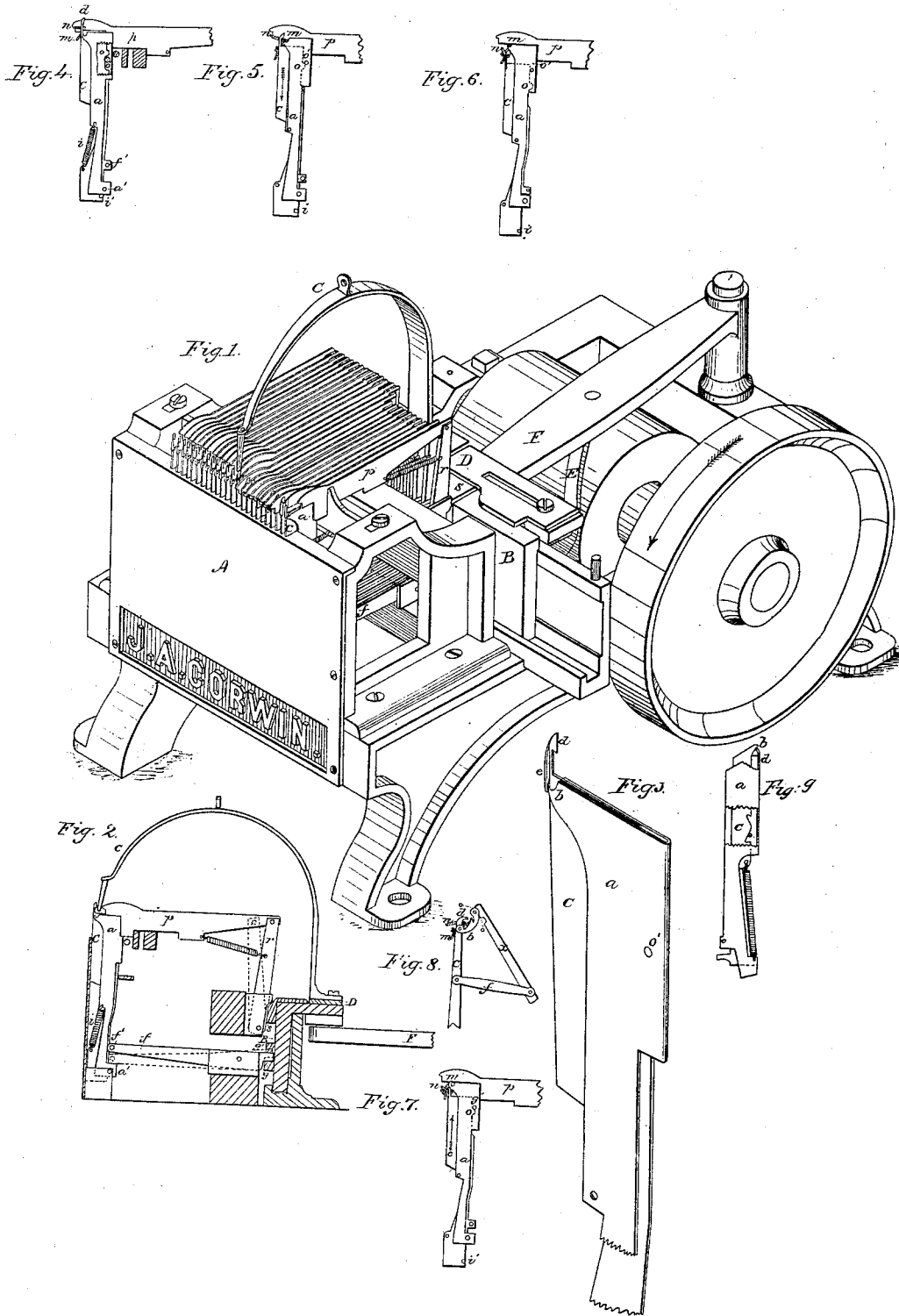


J. A. Corwin.
Straight Knitting Mach.

N^o 11,720.

Patented Sep. 26, 1854.



UNITED STATES PATENT OFFICE.

JOSEPH A. CORWIN, OF NEWARK, NEW JERSEY.

KNITTING-MACHINE.

Specification of Letters Patent No. 11,720, dated September 26, 1854.

To all whom it may concern:

Be it known that I, JOSEPH ALBERT CORWIN, of Newark, county of Passaic, and State of New Jersey, have invented certain new and useful Improvements in Knitting Machinery; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the annexed drawings, making a part of this specification, in which—

Figure I is an isometrical view; Figs. II, III, IV, V, VI, VII, are of parts in detail, fully referred to herein; Figs. VIII and IX show modifications; and similar letters refer to similar parts throughout.

My invention consists in certain improvements in knitting machinery and the chief peculiarity thereof is in the method of forming the loops, whereby I am enabled to simplify very greatly the mechanism of the frame and reduce cost of construction with increased amount of work done. In the old knitting frames the loops must all be formed for the course before those last laid can be cast off, a series of motions having to be gone through with at the end of each traverse of the yarn guide before any new yarn can be laid, and hence there is considerable loss of time. By my invention however this is all saved as the loops are formed and cast off and the course completed as fast as the yarn is laid, hence the yarn guide is ready to return the moment it gets clear of the last sinker. This arrangement is not a necessity of my machine, for if preferred, the loops may all be formed for the course before being cast off, as in the old frame. This however will be productive of a slight loss of time although not as much as in the needle frame.

My machine consists of a series of tools arranged in a row upon a suitable frame for the purpose, each tool being by itself a complete knitting machine and will alone make a perfect loop. It is therefore in consequence of this peculiarity that the loops may be cast off as fast as the yarn is laid as before remarked.

Fig. III, represents one of my loop forming tools drawn in perspective and on a magnified scale and Figs. IV, V, VI and VII are various views illustrating the process of forming the loops.

The tool consists of two pieces which work in combination, one piece being within the other.

The letter (*a*) in the several figures represents a sheath which may be conveniently formed out of a piece of sheet metal, and bent so that a deep and narrow slot is formed as seen in Fig. III. At each of the two uppermost corners there is a sharp pointed hook one of which is shown at (*b*) the other being hidden by the center piece. That center piece consists of a flat plate (*c*) fitted to play in the sheath (*a*) and be embraced by its sides as shown in Fig. III. On the upper corner of this plate there is a peculiarly shaped horn terminating in a barbed head (*d*). From the base of the head there projects a flange on each side of the plate and flush with its edge and as shown at (*e*) in the last named figure which flange serves an important purpose in the working of the machine. It is by the combined operation of the hook (*b*) and barb (*d*) that the loops are thrown off. In working, each of these two pieces has a peculiar motion given to it; one has a play up and down, and the other moves laterally. One piece is fixed to a permanent part of the frame by the pin (*a'*) Fig. II on which it has a slight vibratory motion. In the present described machine the sheath (*a*) is the part represented as thus fixed, and the piece (*c*) as movable vertically. I will now describe what these movements are, as that will be necessary before it can be made apparent how the loops are formed. The plate (*c*) is kept within the sheath by the angular pull of a spiral spring seen at (*i*) Figs. II and IV, this keeps the said plate always up so that its top edge will be flush with the top of the sheath, a stop (*i'*) being at the bottom to hold it. The down motion is given by a lever (*f*) Fig. II secured to a projection at (*f'*) in same figure and seen also in Fig. IV, the upward motion being by the force of the spring (*i*) when the pressure on the lever is released; this upward motion is also further insured by a cam acting on the tail of the lever at (*g'*). The lateral motion takes place during the up and down motions of the piece (*c*) and is caused by a cam cut on the inside of the plate at (*o*) Figs. IV V VI VII, which cam strikes against a pin put through the sheath at (*o'*) shown in the same figures. In Fig. IV, the cam is shown just over the pin ready for action, in Fig. V, it is against the pin, in Fig. VI, it has gone by and the plate (*c*) returned to its first position; in Fig. VII, it

is about to act again on the upward stroke of the plate (*c*).

I will now describe the method of forming a single loop by a single tool. In Figs. IV V VI and VII is a view of the tool dissected from the frame; (*m*) represents the loop of the previous course, and (*n*) that of the last course, the yarn being shown as if in section and consequently cut off at the front side of the machine. At (*p*) is a sinker, around the end of which the new loop is still held in Fig. IV. The plate (*a*) is now to be depressed against the force of the spring (*i*). As it goes down the loop (*m*) comes in contact with the hook (*b*) upon which it is taken, and the object of the flange (*e*) Fig. III, can now be seen, said flange being for the purpose of preventing the yarn from lying too close to the sides of the horn, and thus in the angle so formed, there is a place left for the point of the hook to get by and take up the yarn. The moment the lower loop (*m*) is fairly on the hooks (*b*), the cam (*o*) strikes the pin (*o'*) and forces the sheath (*a*) at its upper end backward from the web as seen in Fig. V, and at this moment also the barb (*d*) takes hold of the loop (*n*) and thus secures it on the horn. The loop (*m*) by this movement has been taken away from under the loop (*n*) and is now being carried past and clear of the barb (*d*) in order that it may be discharged over the horn. As the plate (*c*) continues to descend the barb (*d*) draws down the loop (*n*) and causes it to slip the yarn from the sinker (*p*) as shown in Fig. VI. Here also it will be seen that the hooks on (*a*) are now brought into position over the top of the horn, and as the cam (*o*) has cleared (*o'*) the sheath (*a*) has fallen into its first place by which means the hooks have been brought directly over the barb as shown in last named figure. The plate (*c*) now is allowed to ascend, which it is shown in the act of doing in Fig. VII, and the horn thus strips or discharges the loop which was held on the hook (*b*) the stitch being completed; meantime the loop (*n*) lies upon the lower part of the shank of the horn in the place formerly occupied by (*m*), and the yarn is now to be laid above for the new course, the process thus being continued for any desired length of web. To make a wide fabric or cloth, a number of the instruments or tools just described are set upon a proper frame in a straight line and at the right distance for any given quality of work.

At A, Fig. I, is the front plate of a connected machine, having upon its inner face arranged a series of sheaths (*a*) and plates (*c*) before described. These stand in a vertical position, and to give greater stiffness and accuracy to the movements of the plate (*c*) they are supported in a comb or rack cut in the upper edge of the plate A. The plates

(*c*) are drawn down by a series of treadle levers (*f*) and are operated by a traversing cam or slur-cock, shown at (*g*) Fig. II said cam being attached to a carriage B, traversing in guides across the frame.

The sinkers lie horizontally as shown in Fig. I, at (*p*) and are attached to the jack-levers of common construction, those standing vertically however as shown at (*r*). The sinkers are sent forward by a slur-cock fixed to the carriage B at (*s*) Figs. I and II, said slur-cock being made adjustable to vary the depth of the loops, as usual. The sinkers are provided with recoil springs which cause them to return the moment the slur-cock clears them or a cam or other construction may be used instead. This is because the whole of the operation of forming the loop is effected while the slur-cock passes along. Attached to the carriage B there is a yarn guide C affixed to a shifting plate D in order to set the guide before the slur-cock, so that it may precede the action of the latter, in a manner well known. The carriage B, which effects the working of the whole machine, is moved by any convenient device. It is represented as being propelled by a cylindrical cam E on the main shaft and this vibrates the lever F to which the carriage B is attached.

The operation will now be as follows:—Motion being given to the cam E the carriage B will advance; the point of the yarn guide C will pass just back of the horns and below the barb (*d*) as shown in Fig. II. (It is presumed that there is already a starting course on the horns.) The slur-cock (*s*) now strikes against the jacks and pushes forward the sinkers (*p*); these sink the yarn into loops around the shanks of the horns and so soon as there is a sinker advanced on each side of a horn the plate (*c*) may be depressed. The cam or second slur-cock (*g*) now strikes the end of the levers (*f*) and effects the depressing of the piece (*c*). As it comes down the barb (*d*) takes hold of the loop last laid and draws it downward through the loop of the previous course which latter loop has settled upon the hook (*b*) by which it is carried backward and away from the horn by the lateral motion of the sheath (*a*) in order to make room for the passage of the upper loop through; it is then allowed to come forward and be in position for having the loop discharged, which is done by the ascent of the horn in the manner before described. The formation of each loop is thus a distinct and separate operation, going on as fast as the yarn is laid. Thus is all that time saved which is required in the old mode wherein the whole row of loops must be laid first, the "presser" brought into play, the "sinkers" raised, and the "cast-off" effected. The web hangs by the last course as in the

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old mode and is taken up by a take-up-roller, or other proper device.

Although I have described the arrangement of my loop forming tools as being in a straight frame, they are capable of other arrangements, and such I contemplate. They may be arranged on a circular frame and a cylindrical web woven by a rotary motion of the slur-cocks. And if so arranged would be capable of performing a much greater amount of work than on a straight frame. When so arranged there may be many yarn carriers, laying yarn for loops all at the same time, for so soon as one loop is cast off another yarn may be immediately laid and another loop formed &c.

It will also be seen that great certainty is insured by the action of my machine, for while the loop is being formed each part is grasped or held by one of the loop forming hooks and cannot be let off until the proper time. By it therefore, other materials besides yarns may be worked, as wire, and some of the stiffer grasses, thus I contemplate forming fabrics by it which cannot be worked on the old knitting frames.

It is evident that there may be modifications in the construction of the loop forming hooks, and the manner of working them; plate (c) for instance may be stationary and the sheath made to move, and instead of the sheath, a trip-lever with a hook at its end may be used to lift up and cast off the loops.

In a straight frame a plurality of yarn guides may also be used and these be all in operation at the same time, for so soon as the loop is cast off which was laid by the first guide, a second may at once follow, and so on, as many as may be found desirable.

In respect to some of the variations in

the construction of the loop-forming tools Figs. VIII and IX are representations of such. In Fig. VIII the hook (d) and plate (c) are stationary, but receive the yarn in the same manner. The cast-off is effected by the circular movement of the hook (b) which is here cut on a short curved arm centered in the plate (c) while the lever (f) is connected and made to operate by a post (x) as shown, or the slur cock may traverse directly under the end of said post (x). In Fig. IX the sheath (a) is made stationary, and it has on it the supporting hook (d) while the plate (c) has the cast-off hooks (b). In this latter place the plate (c) performs both the vertical and lateral motions, while the sheath is quite stationary.

What I claim as of my invention and desire to secure by Letters Patent is—

1. The tool on which the loops are formed and interwoven, consisting of two pieces terminating in hooks or barbs or other equivalent thereto, and so combined that when motion is given to said pieces, one of the hooks shall seize the loop last deposited and retain it while the other shall take up and cast off the loop of the previous course whereby the two become intertwined and a netted fabric formed as set forth.

2. I claim the flange (e) or any equivalent for making a recess or groove upon the sides of the plates or shank of the horn, whereby a space is made for the point of the take up hook to pass behind and seize the loop as described.

The whole being constructed and operating in the manner and for the purposes substantially as described herein.

JOSEPH ALBERT CORWIN.

Witnesses:

J. P. PIRSSON,
S. H. MAYNARD.