

(No Model.)

3 Sheets—Sheet 1.

J. H. OSBORNE.
KNITTING MACHINE.

No. 349,808.

Patented Sept. 28, 1886.

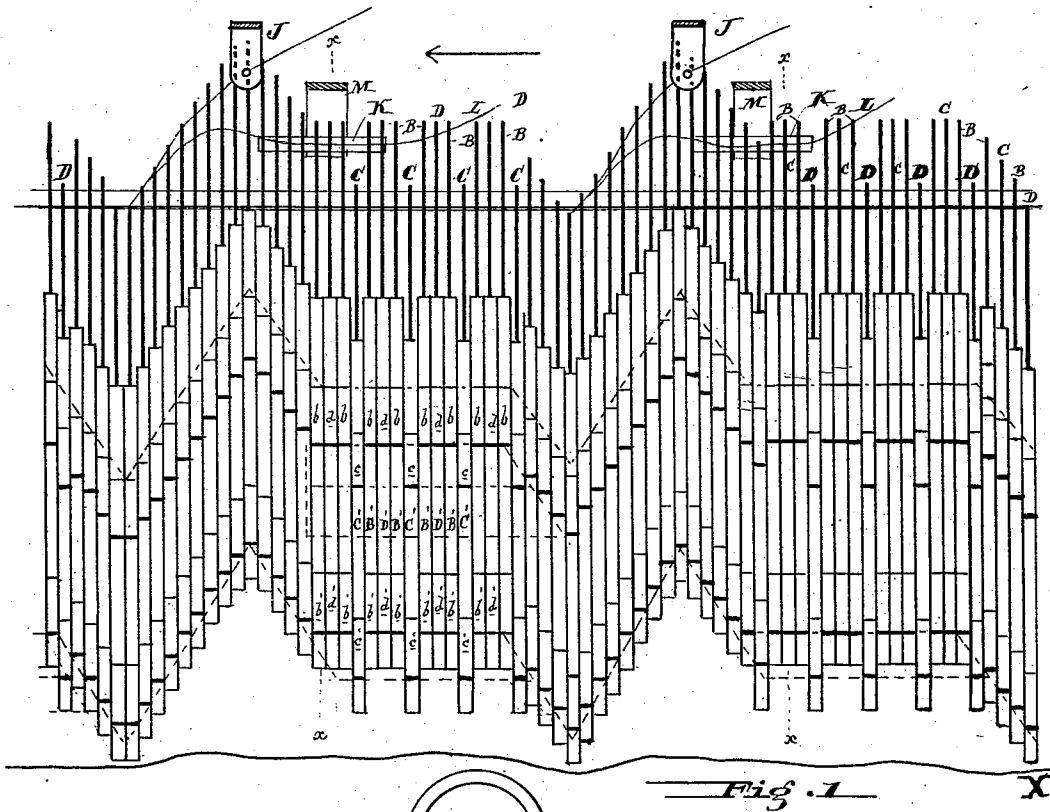


Fig. 1

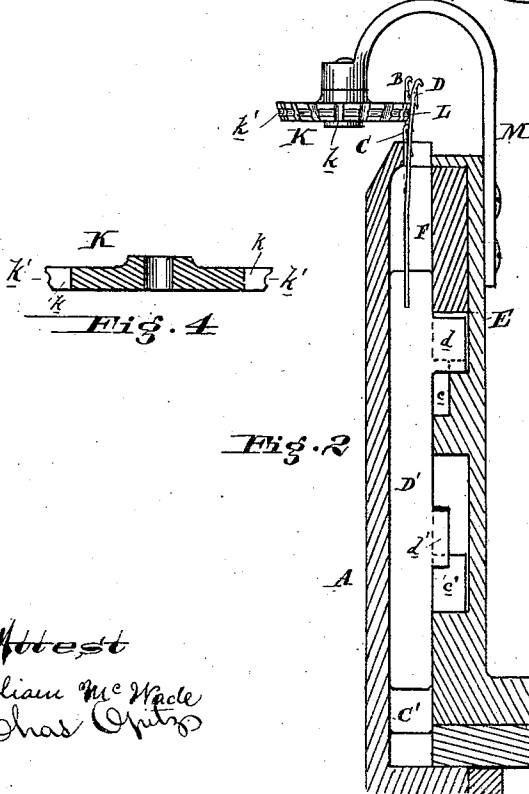


Fig. 2

Fig. 3

Fig. 4

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John H. Osborne
By *[Signature]*

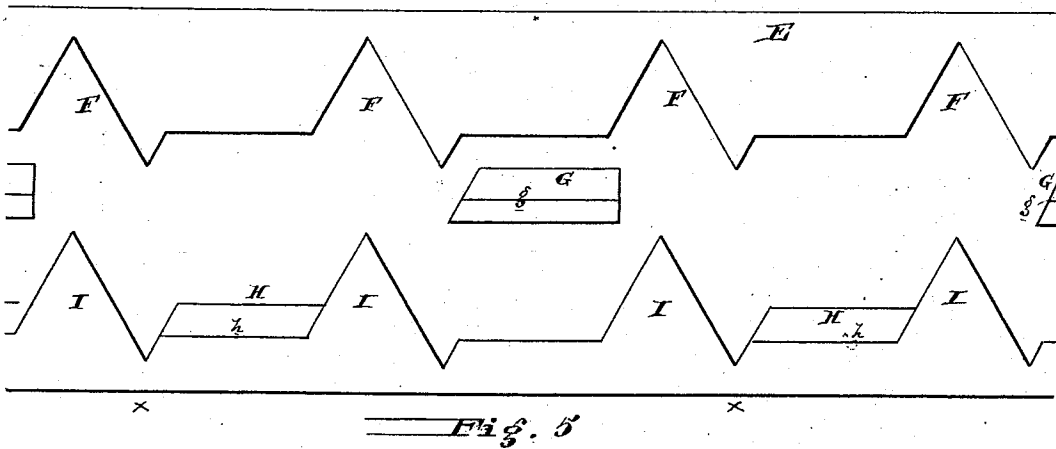
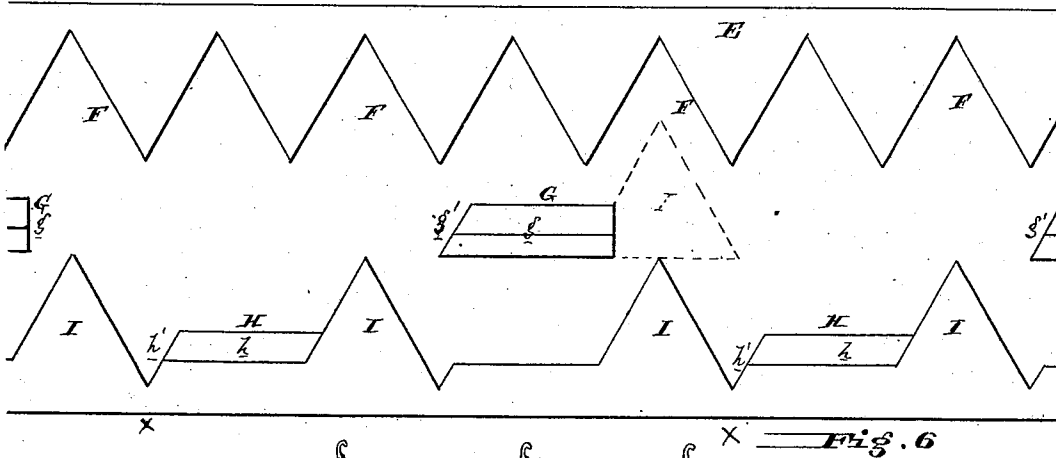
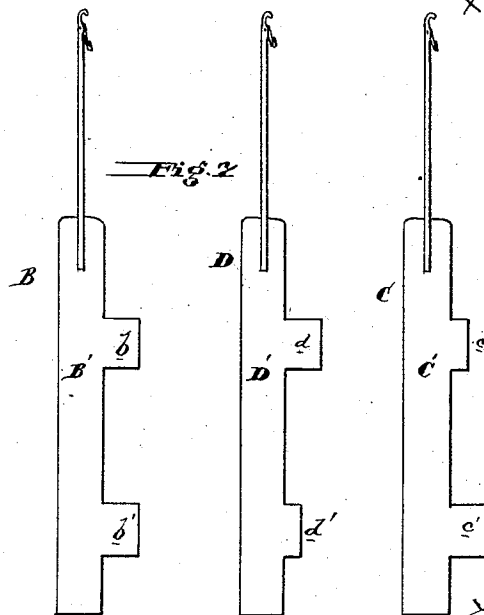
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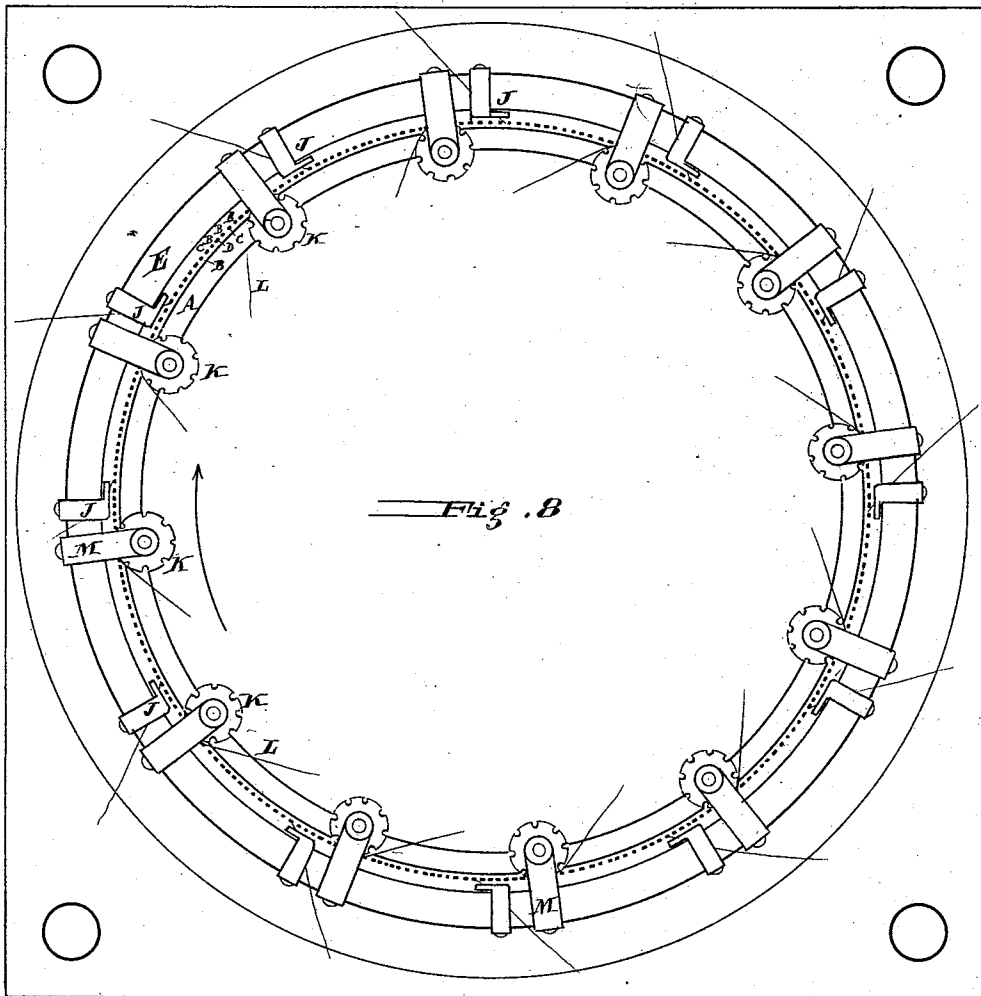
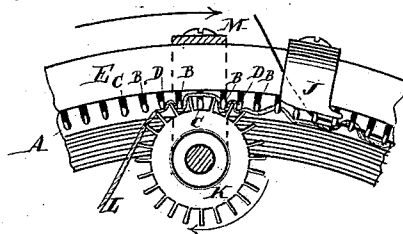
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UNITED STATES PATENT OFFICE.

JOHN H. OSBORNE, OF PHILADELPHIA, PENNSYLVANIA.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 349,808, dated September 23, 1886.

Application filed June 15, 1883. Serial No. 98,188. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. OSBORNE, of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Knitting-Machines, of which the following is a specification.

My invention has reference to knitting-machines adapted to knit fabrics having plush backs; and it consists in mechanism for moving certain of the needles vertically at specified intervals, there being two sets of needles for laying in the weft-threads, the needles in each set being operated alternately to take the said weft-thread, to the end that the plush back made thereby shall be formed of loops arranged in diagonal lines, and in details of construction, all of which is fully set forth in the following specification, and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to provide mechanism capable of producing the loops forming the pile in diagonal lines, whereby the fabric, when combed or carded, will more evenly felt or mat and produce a more perfect plush back.

In the drawings, Figure 1 is an elevation of a part of a knitting-machine embodying my invention, with the cam-cylinder removed to show the manner of the arrangement of the needles by the peculiar formation of the cams and construction of the needle-jacks. Fig. 2 is a sectional elevation of one side of same on line *x x*, Fig. 1. Fig. 3 is a plan view of a portion of the same, showing one method of laying the weft-thread in between the needles, back of some and in front of others. Fig. 4 is a section of one form of the filling-wheel. Fig. 5 is an elevation of a portion of the cam-cylinder laid out straight. Fig. 6 is a modified form of same, showing my improved needle-cams as applied to an ordinary upper needle-cam of a knitting-machine. Fig. 7 is an elevation of each of the three forms of needles used. Fig. 8 is a plan view of the knitting-machine, showing the relative arrangement of the filling-wheels and guides; and Fig. 9 shows a modified form of weft or pile thread feed-wheel in the act of feeding the weft or pile thread to the needles.

A is the needle-cylinder.

B, C, and D are the three sets of needles provided, respectively, with needle-jacks B',

C', and D', the jacks B' being provided with two wide projections or lugs, *b b'*, the jacks C' being provided with a narrow lug, *c*, at the top, and a wide lug, *c'*, at the bottom, and the jacks D' being provided with a wide lug, *d*, at the top, and narrow lug *d'* at the bottom. The needles are arranged as shown in Fig. 1, in which the needles of the C and D set are arranged alternately; and a needle of the B set interposed between every C and D needle, thus forming the needles in the order B C B D B C B D, &c.

E is the cam-cylinder, which is formed in a novel manner, being provided with cams F, adapted to act upon the upper lugs of all of the needle-jacks to draw the needles down through the loops of the fabric, cams G adapted to raise all of the needles a given distance except those of set C, which are provided with jacks having the narrow lug *c* at the top, and which runs upon the cam-face *g*, cams H, adapted to raise all of the needles a given distance except those of set D, which are provided with jacks having the narrow lug *d'* at the bottom, and which runs upon the cam-face *h* and cams I, which are adapted to raise all of the needles the full height.

It is evident that while I have shown the cams I all in a row at the bottom or in line with cams H, every alternate of said cams I may be made on the end of cams G, as shown by dotted lines in Fig. 6; but it is more convenient to place them all at the bottom.

The cams G, I, and H to raise the needles are arranged in succession all or part way around the cylinder E.

J are yarn-guides, which are adapted to feed yarn to the needles as they are descending from their highest limit; hence there are as many yarn-guides as there are cams I, and these guides feed the yarn from which the body of the knitted fabric is made.

K are filling-wheels or feeding devices to place the filling-yarn, which ultimately forms the plush or pile on the back, between the needles or back of one or more needles and front of one needle all the way around. This filling-wheel is formed with notches *k*, which take in every fourth needle, and has a groove, *k'*, about its periphery to guide the yarn L. This wheel K is supported by a frame or bracket, M, secured to the cam-cylinder E,

and is arranged back of the needles and at a position where all of the needles commence to rise; hence there are as many wheels K as cams G and H combined. There are an equal number of wheels K and yarn-guides J, they being arranged alternately about the machine.

In place of a solid wheel notched, as in Fig. 3, I may use a toothed wheel, as shown in Fig. 9, in which the needles are not in anywise sprung or bent, but the yarn is pressed forward, as shown, to allow either the C or D needle to rise back of the loop thus formed.

The operation is as follows: The needle-head is rotated in the usual manner, as indicated by the arrows in Figs. 1 and 8, carrying with it the needles. Beginning at the point X, all of the needles are raised successively by means of the cam-face *h'*, then the lugs *d'* of the needle-jacks of the D set of needles run upon cam-face *h*, and all of the needles of the B and C sets are raised considerably by the wide lugs *b'* and *c'* of their jacks running upon the cam H. This separates the D set of needles from all of the others. Now, as the needles are moved past the wheel K, the raised needles may be pressed outward slightly, and the yarn L fed in back of the needles of the B and C sets. Then the cam I raises all of the needles, and those of the D set in rising pass back of the yarn L; hence by this construction the weft or pile thread is placed back of three needles and in front of one, and so on. After all of the needles have risen to their full height in the act of descending they take the yarn from the guides J, thus binding in the pile-yarn. The cam F then draws down all of the needles and the pile-yarn, which was back of the three needles forms the pile or loops on the back of the knitted fabric. Now, the same operation takes place with the next set of cams, only in place of cam H cam G comes into play on the upper lugs of the needle-jacks, and in this instance raises the needles of the B and D sets and leaves the set C down, and the loop or pile is formed as before, only as the sets C and D alternately take the pile-yarn the loops will be formed in a diagonal line down the back of the fabric. If only the needles of the sets C and D be used and arranged alternately, the filling-yarn L will form twilled surface or diagonal lines.

In place of pressing out the needles when laying in the pile or weft thread, the wheel K may be made like a spur-wheel, (shown in Fig. 9,) and then the yarn will be forced forward in a loop to allow the ascending needle to pass back of it; but either means is equally applicable to my invention.

My needles which pass in front of the weft or pile thread do not have to rise while passing the feed-wheels, and hence are not so liable to break.

I do not limit myself to the exact construction shown, as the mechanism may be modified without departing from my invention.

I am aware of the patents to Salisbury, No. 212,269, of 1879; Abel, No. 105,539, of 1870, and Kilbourn, No. 47,829, of 1865, and claim nothing therein set forth or claimed.

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

1. The needle-head and three sets of reciprocating needles carried thereby, two sets of which are adapted to take in the weft-thread, in combination with two or more yarn-guides to feed yarn to the front of the needles, two or more feeding devices to feed yarn to the rear of some and in front of other of the needles, said feeding devices being arranged between two yarn-guides, and vice versa, cam mechanism to raise all of the needles but those of one weft-set as they pass before the feeding devices at one place, cam mechanism to raise all of the needles and then draw them down through the fabric in succession, cam mechanism to then raise all of the needles but the other weft-set as they pass before the next of said feeding devices, and, finally, cam mechanism to raise all of the needles and then draw them down through the fabric in succession, substantially as and for the purpose specified.

2. The combination of a needle-head and three sets of needles, B, C, and D, arranged therein in a circle and in the order specified, two feed-wheels for laying in the weft or pile threads, and two yarn-guides adapted to feed the yarn from which the body of the fabric is knitted, the said guides and wheels being arranged alternately, with cam mechanism to raise the B and C sets first in passing the first of said feed-wheels, and the B and D sets first in passing the second of said feed-wheels, substantially as and for the purpose specified.

3. The combination of needle-head A, three sets of needles, B, C, and D, having their jacks constructed substantially as set forth, cam-cylinder E, having cams F, G, H, and I, substantially as and for the purpose specified.

4. The combination of needle-head A, three sets of needles, B, C, and D, having their jacks constructed substantially as set forth, cam-cylinder E, having cams F, G, H, and I, the cams G and H, having, respectively, faces *g* and *h*, feed-wheels K, and yarn-guides J, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

JOHN H. OSBORNE.

Witnesses:

R. M. HUNTER,
WM. MCWADE.