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THE BICKFORD KNITTING MACHINE.

On Exhibition at the Fair of the American Institute.

In this age of stupendous events, of mighty achievements, when daily fresh laurels are gathered by politicians, statesmen, diplomats, and by attorneys, eloquently pleading at the bar of justice in behalf of the oppressed and friendless, some of the most sanguine among us look on in blank astonishment, and exclaim "truly the great climax of all science and ingenuity is fast approaching!" But while we are thus musing, and even before we arouse from the lethargy that enwraps us, those who are searching for hidden treasures in the great temple of genius, bring forth some new, rich, rare trophy, some gem of dazzling brightness.

Among these increasing explorers in the halls of scientific research, we place Mr. DANA BICKFORD, whose magnificent series of inventions—some fifty in all—for the amelioration of the condition of those who toil, are of as intrinsic value as those discovered by Howe, Morse and Bruce.

We propose to treat at this time upon that wonderful piece of mechanism from his inventive brain, the FAMILY KNITTING MACHINE. Mr. Bickford himself having taken the introduction of this machine which we bring before our readers at the present time, has added such improvements thereto as renders it *the most simple, durable and efficient knitting machine in the world.*

Those who have seen the complicated knitting machines which are used in large factories and at the present time flood the market with knit goods of various descriptions, have come to regard them as intricate affairs. The invention of this machine has revealed to the public the fallacy of this idea, and we see that a great variety of work can be accomplished by a simply constructed machine, and one which can be put together and operated by those unaccustomed to the use of machinery. They will set up their own work, knit backwards and forwards, making the most perfect imitation of the hand stitch, taking every knot and imperfection inside, so that not only all kinds of work requiring to be knit tubular can be accomplished, but also a flat web with selvedge edge.

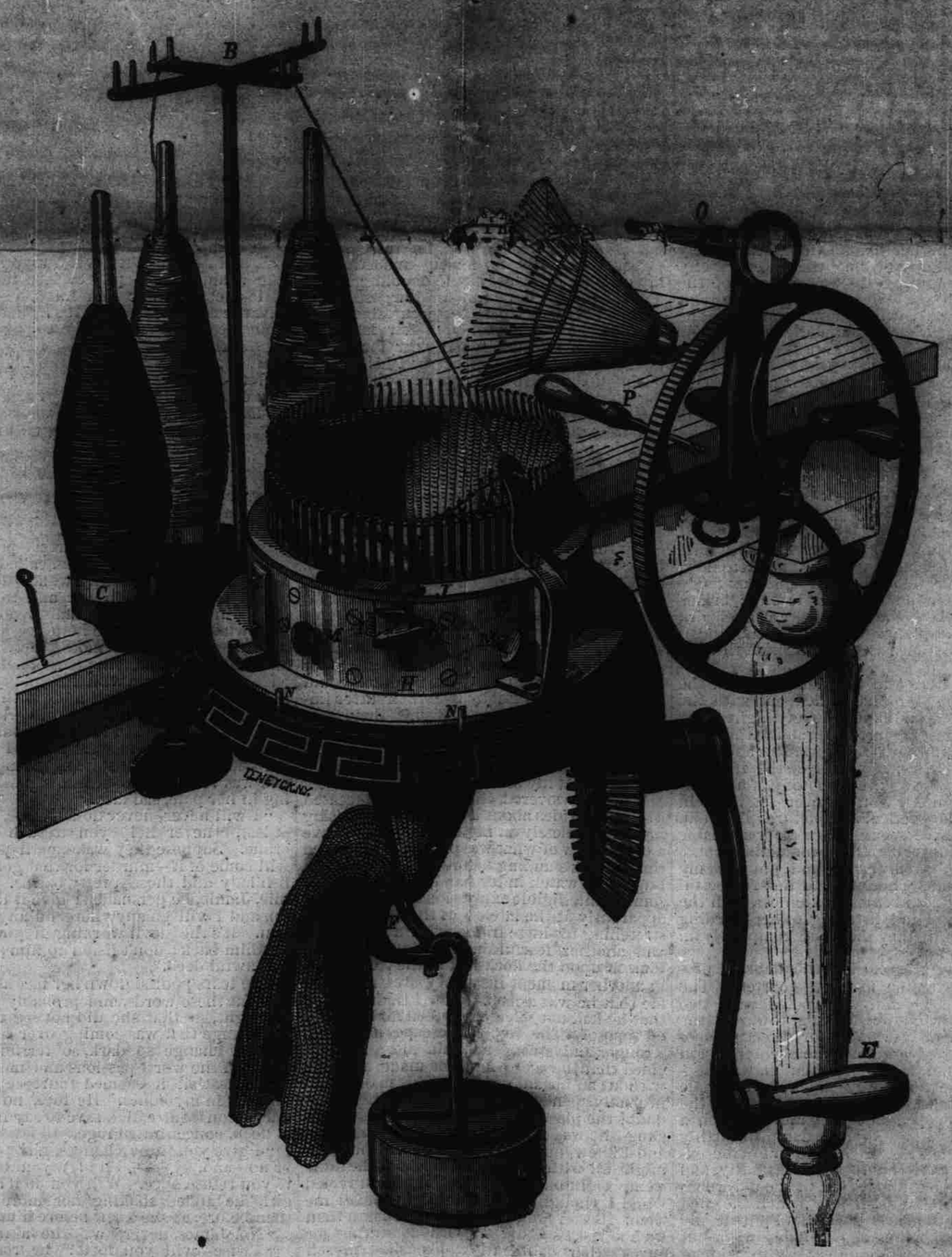
It narrows and widens a web from one to two hundred and eight needles wide; and will shape either a square or round heel. closing it at the foot, and narrowing off the toe complete, *which cannot be performed by any other machine hitherto produced.* The most intricate stitches can be formed by this machine as skillfully as with the deftest fingers; thus rendering it a complete knitting and crotcheting as well as circular and flat web machine combined.

Unequalled facilities for manufacturing, together with the new style of finishing make it the most perfect piece of machinery extant.

Among the multitudinous articles made by the Bickford Family Knitting Machine, are children's carriage mats, tufted door and carriage mats, muffs and collars, table and bed spreads, tidies, cradle blankets, scarfs, infants' skirts, socks, caps and hoods, shawls, breakfast jackets, nubias, shirts and drawers, carriage and children's afghans, undersleeves and leggins, smoking and skating caps, mittens and gloves, gentlemen's and ladies' hose, and numerous other articles, which, were they all mentioned at this time, would by far overrun our space.

After thus giving our readers, in a concise manner, some idea of the superior merits and utility of this wonderful apparatus, we will now proceed to give an explanation of its modus operandi, of which full illustrations are given in the accompanying engravings.

It is obvious that the machine, exclusive of needles and the toothed wheel, consists of only sixteen parts, as follows: A, thumb screw to fasten machine to table; B, yarn stand; C, pins for bobbins; D, yarn carrier and sliding ring to which a carrier is attached; E, machine handle; F, buckle; G, weights; H, revolving cylinder; I, needle cylinder; J, ring clasp; K, cam and screw for changing length of stitch; L, indicator to show distance moved; M, swing cams and their thumb screws; N, pins for knitting flat web; O, set up; P, looper.



THE BICKFORD FAMILY KNITTING MACHINE—*Office No. 689 Broadway, New York.*

The three first and three last mentioned, including the buckle, F, and the weight, G, are not moving parts, the latter only being eight in number. So that the reader may comprehend the actions of these facts we will first explain the stitch taken in the knitting of an ordinary stocking, after the ribbed top has been knit, and the work is proceeding in the leg or foot. Figure 3 represents four of the needles with the yarn looped upon them, and the needle used is shown complete at No. 1. The needle consists of a body, an angular bent position or foot, R, a hook, S, and a latch, T The latter is pivoted to the body of the needle at N, and works partly in a slot formed in the body. The latch has a spoon-shaped end, shown at V, which, when the latch is closed, as shown in needle No. 2, meets and partly shuts over the point of the hook, S, so that the loop formed on the needle slips off when the latter makes its downward movement.

This needle is not a new invention, but improvements in form have been made. One of which improvements is the depression or hollow shown at Z, Fig. 3, while the still deeper depression Y, is another improvement, the use of which will be alluded to further on; Fig. 2, shows the parts employed for moving the needles up and down. M, in this figure, represents cams. These are screwed to the inside of the revolving cylinder, H, Fig. 1, their position being directly under the set screw M, as these cams are carried round by the revolving cylinder, the angular bent part or foot, R, of needle passes through the curved space between the curved cams, Fig. 2; and as the needles are held from moving sideways by being placed in the grooves formed in the needle cylinder, J, Fig. 1, they are forced up and down as desired.

On the bottom of the revolving cylinder, H, teeth are formed, which mesh into a bevelled gear turned by the handle, E, and the yarn wound upon a bobbin is placed on one of the pins, C. It is then passed over the yarn stand, B, and thence through a hook in the top of a bent bar, D, called the "carrier," which carrier is fastened to the revolving cylinder, H, carrying the cams. If we attach buckle, F, to this, and hang on the weight, G, we have but to turn the crank to cause the knitting machine to knit continuously.

In setting up the work. the set up, O, and the looper, T, are used, and a length of thread is run off the bobbin sufficient to form the first set of loops the same as in casting the stitches on hand needles. This thread is passed through an eye in the front of the looper. The set-up is taken in the left hand, put in the cylinder and held, so that the hooks are nearly on a level with the top of the cylinder. The looper is then passed about the hooks of the set-up and the tops of the needles, carrying the thread with it, and forming a series of loops like those shown in the lower series, in Fig. 3, as soon as the needles are filled, one turn is given the machine, and the first set of stitches is completed.

The stitches are made longer or shorter, so as to knit open or close by the raising or lowering of the movable cam, K, Fig. 2. When this cam is raised the stitches are made shorter. The setting of this cam is done by the middle thumb screw, K. Fig. 1, an indicator point L. In knitting flat webs, both the adjustable cams, M, Fig. 2, must be in the position shown.

If a stocking is to be seamed to the top, every third or fourth needle is first taken out. The work is then set up and the knitting proceeds three or four inches. Then the needles taken out are inserted, and three or four inches knit plain. The stitch may be knit loose over the calf of the leg, and gradually tightened to the ankle, shaping it nicely: or it may be narrowed down to the size desired by taking out the needles. In knitting a stocking or sock, either a square or round heel may be formed. To knit a square heel, after knitting the leg long enough, the machine is stopped with the carrier, D, at the back side, the needles in front are then pulled up until each loop passes into the notch, Y, Fig. 3, which holds them so that they will pass over the cams without knitting for the instep. The pins, N, are then inserted on each side oppisite the fourth needle of those drawn up. The knitting is continued backward and forward until the heel is long enough, which is 36 times for a common sock.

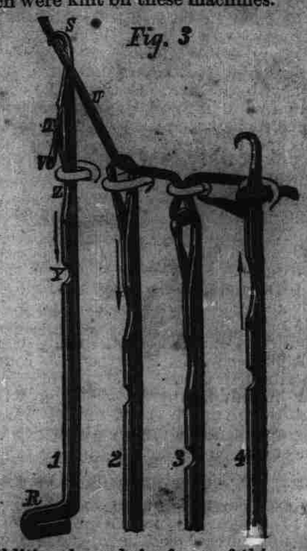
In knitting a round heel, one half the needles are put up, and the pins are placed as described for the flat heel, when the machine is turned to the left as far as it will go, and pull up the last needle knit then back to the right, when the last needle on the right is raised; then to the left, pulling up the last needle on the left, next to those already drawn up, thus knitting across and pulling up needles, first on one side and then on the other, until one-third of the needles are left down. After having narrowed the heel, we commence to widen to the same size started from. In order to do this we knit across once, then put down the last one raised up; knit across again and push down the last one raised up on the other side, and thus continuing until the heel needles are down and the foot is knit.

Fig. 2

Different cylinders are applied containing various sizes of needles for coarse and fine work. Extra needles and pins are also furnished; and a bobbin winder goes with each machine. Nearly thirty patents have been in the machanical arts, bearing date from September, 10, 1867, to September 17, 1872, and further applications are still pending.

A capital of $250,000 is invested in this business, and in such a judicious manner is it conducted, that should he desire it he could dispose of the same machine for the sum of $400,000! The operators at the store—which is at 689 Broadway, this city—are affable and courteous to those visiting this place, for the purpose of seeing the machine in operation, and they are evidently, thoroughly sophisticated in all the arts requisite to the skillful management of this machine; and by their courtesy we were enabled to examine some of the most prominent articles which were knit on these machines.

Fig. 3



Additional words in favor of this machine and its unparalleled merits and popularity, might be said, for reliable testimonials are not wanting. With a man at its head like Mr. Bickford, we do not wonder at the success of this over every other machine before the public. Few, if any, possess the inventive genius of Mr. B., and it is more seldom that we see combined with it, such remarkable executive abilities, uprightness, and true gentlemanly bearing, as is personified in this gentleman; and this we say without wishing to exaggerate his praise in the slightest degree.

BICKFORD KNITTING MACHINE CO.

PRICES:

No. 1 is the regular Family Machine, with common Coarse Cylinder,	$25
No. 1, with much better finish and extra fixtures,	30
No. 2, with fine Cylinder only,	28
No. 2, with extra finish, etc.,	33
No. 3, Family Machine, with both Coarse and Fine Cylinders,	35
No. 3, with extra finish, etc.,	40
No. 4, with both Cylinders nicely plated with Nickel,	45