

(No Model.)

J. JOHNSON.
KNITTING MACHINE.

No. 564,886.

Patented July 28, 1896.

Fig. 1.

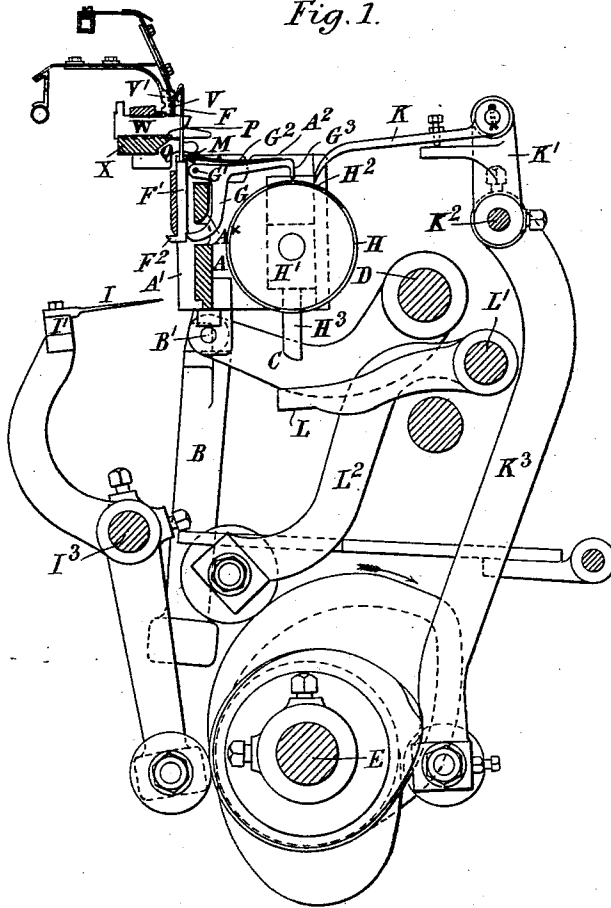
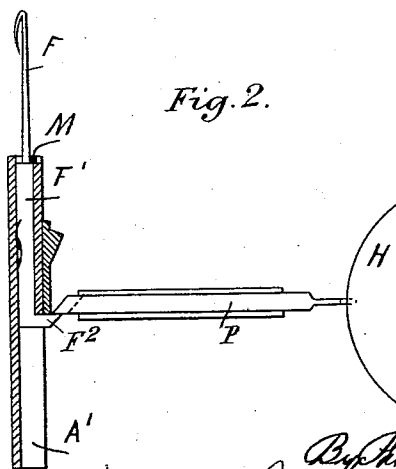


Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

JOSIAH JOHNSON, OF LEICESTER, ENGLAND, ASSIGNOR OF ONE-HALF TO
JOHN ARTHUR ALLEN BARFOOT, OF SAME PLACE.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 564,886, dated July 28, 1896.

Application filed April 6, 1896. Serial No. 586,376. (No model.) Patented in England November 3, 1894, No. 21,129, and in France November 20, 1895, No. 251,862.

To all whom it may concern:

Be it known that I, JOSIAH JOHNSON, foreman, a subject of the Queen of Great Britain, residing at Canning Place, Leicester, England, have invented certain new and useful Improvements in Knitting-Machines, (for which I have obtained Letters Patent in Great Britain, No. 21,129, dated November 3, 1894, and in France, No. 251,862, dated November 20, 1895,) of which the following is a specification.

Heretofore various colored patterns have been produced in knitted fabrics by causing (at each course of work) some of the needles only to be brought into position to take thread and have work produced upon them while the other needles remain idle and out of work until at the next or some subsequent course work is to be produced with a thread of a different color or material. Such colored patterns have been produced in a straight-bar-knitting machine having a fixed needle-bar, and the needles have been shifted endwise in grooves in the needle-bar by the action upon them of a Jacquard barrel to put them into or out of action at each course as the pattern required.

The object of my invention is to improve the construction of machines for producing colored patterns of the above kind in knitted work.

I employ a knitting-machine of the "Cotton" type (that is, a machine in which the needle-bar has a rising-and-falling as well as a to-and-fro horizontal motion given to it,) and at each course of work I cause those only of the needles which are to have work made upon them to be fast with the needle-bar and be moved to and fro with it while the other needles are left at rest and out of action and have no work produced upon them. To control which needles shall thus be brought into work at each course, I employ catches acted upon by a Jacquard barrel.

Figure 1 of the drawings annexed shows a vertical section of the main parts of a straight-bar-knitting machine of the Cotton type arranged according to my invention. Fig. 2 shows a modified arrangement of the catches.

A is the needle-bar, carried by a vertical le-

ver B, which at B' is jointed to a horizontal lever C, fixed on a shaft D, the lever B and the shaft D being both rocked by the action of cams on the main cam-shaft E, as is usual in a Cotton machine. These cams are not shown in the drawings.

F are the needles, each fixed in a separate "bit" or "jack" F', which can slide endwise in a guide-groove in the back of the needle-bar A.

G are lever-catches lying between the plates A' and turning around a wire at G'. G² are springs, one of which bears upon the horizontal arm of each lever G and tends to turn the lever into position for the lower end of its other arm to come below the end of the needle-bit F', a slot A^x being formed through the needle-bar for these arms of the catch-levers to pass through.

Standing out from the front of the ends of the divisions of the needle-bar are projecting arms A². These have vertical slots cut in them in which are received bearings H' for the axis of a barrel or drum H. The slots are of greater height than the bearings, so that the bearings can be moved up and down within them. The horizontal arms of the lever-catches G are made to extend forward to come above the top of the barrel and their ends G³ are bent downward in a vertical direction, as shown.

Rows of holes are formed in the barrel at intervals apart and parallel with its axis. The barrel has a step-by-step rotating motion given to it, so as to bring the rows of holes in succession below the ends G³ of the horizontal arms of the lever-catches G. When a row of holes is brought below the ends G³ and the barrel H is raised, the ends G³ of some of the lever-catches enter holes, while the ends G³ of the remainder of the lever-catches have no holes opposite to them and are turned a distance by the barrel coming against them. This withdraws the lower end of the descending arm of these lever-catches from below the lower end of the needle-bits F', so that when the needle-bar rises these needles will not be carried upward with it.

Each needle-bit has a projection F² extending backward from its lower end. When the

needle-bar descends, these projections are brought below the ends of narrow spring-blades I. There is one such spring-blade for each needle-bit. The blades are all carried at their rear ends by a bar I'. This bar is carried by arms from a shaft I³, to which a rocking motion can be given by other arms which descend from it and are acted on by cams on the cam-shaft E.

When the needle-bar has descended to its lowest position, the shaft I³ is rocked and the forward ends of the spring-blades I are brought above the projections F² at the back of the needle-bits and hold the needle-bits down at the time when the needle-bar again rises, unless any needle-bit has the lower end of its lever-catch G below it, in which case the needle-bits are carried upward with the needle-bar, the spring-catches I then yielding to allow the projections F² to pass them.

The barrel H has a step-by-step turning movement given to it in the following manner: On the axis of the barrel is a ratchet-wheel H², with which a pawl K engages. The pawl is carried by a lever-arm K' on a shaft K². Other arms K³ descending from the shaft K² are acted on by cams on the cam-shaft E. The cams are formed in such manner that when the needle-bar has completed its rise and while the draw is taking place the pawl is brought against one of the teeth of the ratchet-wheel and turns the barrel a distance so as to move one row of holes in the barrel from below the ends of the lever-catches G³ and bring the next row of holes below them. Just before the needle-bar commences to ascend the barrel is raised a distance, and thereby moved against the ends of some of the horizontal arms of the lever-catches and causes these catches to release their hold upon the needle-bits they work with, while the other lever-catches, the ends G³ of whose horizontal arms are opposite to holes in the barrel, remain unmoved and retain their hold of the needle-bits they work with, so that when the needle-bar rises these needles are carried upward along with it. The rest of the needles remain down, hanging onto the work, being held down by the spring-blades I. The needles carried up with the needle-bar then have a course of work made upon them in the ordinary manner. Thread is laid along the several needles and formed into loops between them by the sinkers. Afterward the needles are carried downward with the needle-bar by reason of a wire M, which is passed through the plates A', coming just above the top of the needle-bits. When the points of the beards of the needles have descended below the thread which lies above the sinker-nibs, the beards are pressed against the fixed presser-bar P and closed against the needle-stems until by the downward movement of the needles the points of the beards have entered the old loops of work which were on the needle-stems and at the end of the downward movement of the needles. As the nee-

dles descend below the knocking-over bits Q these old loops are cast off from the needles.

The barrel is raised at the proper time by pins H³, projecting downward from its bearings, being acted on by arms L on shafts L', to which a rocking motion is given by another arm L² upon it being acted on by a cam on the cam-shaft.

The cams are so shaped as to cause the arms L to lift the barrel a distance just before the needle-bar commences to rise, as above explained, and then as the needle-bar rises to keep the barrel rising up with the needle-bar almost to the end of its upward movement and then descend out of the way sufficiently for it to become free from the ends of all the lever-catches, and it is then ready to again have a partial turn given to it while the draw is taking place. The barrel is shown in this position in Fig. 1.

While the needle-bar is descending the bar I' is moved backward, so that the ends of the spring-blades I, which it carries, are out of the way of the projections F² of the needle-bits. At the end of the downward movement of the needle-bar all the needles have again been brought into line and the bar I' is again moved forward, so as to bring the ends of the spring-blades I again above these projections.

Two thread-layers V V' are provided and brought into action alternately, two courses being first made with one thread-layer, then the next two courses with the other thread-layer, and so on, as in an ordinary machine for producing striped work, or single courses only might be made in succession with each thread-layer. Similarly three or more thread-layers might be used, but I prefer to use two, as above described.

W are the sinkers.

X is the fixed sinker-bar, the forward edge P of which forms the presser-bar, against which the needle-beards are pressed to close them at the proper time, and Q are the ordinary knocking-over bits.

The means for giving motion to the sinkers and to the thread-layers are not shown in the drawings, as these are well known.

It is not essential that the catches and Jacquard barrel should be carried by the needle-bar. They might be separate from it, as illustrated in Fig. 2. In this case the catches would serve to hold the needles down as the needle-bar moved upward, while the remainder of the needles would be carried up together with the needle-bar by friction.

In Fig. 2 the catches are shown as being formed of thin slides P, which at one end are acted upon by a Jacquard barrel and at the other end can be brought above projections F², which stand out from the needle-bits.

The above-described arrangement of mechanism is applicable whether bearded or latch needles are used. If latch-needles are used, the needle-bar would only require to have an up-and-down motion given to it and not a motion toward and away from a presser-bar.

What I claim is—

1. A straight-bar-knitting machine having provisions in virtue of which the needle-bar has an up-and-down motion given to it, needles or jacks mounted in guides on the needle-bar, and instruments upon the needle-bar by which those needles only upon which work is to be made at any one course are locked to the needle-bar and move with it while the remainder of the needles are not locked to the needle-bar and remain out of action substantially as described.

2. In a straight-bar-knitting machine the combination of the fixed presser-bar, the needle-bar having an up-and-down and a horizontal to-and-fro movement, the needles the catches which lock the needles to the needle-bar when work is to be made upon them and means for controlling which needles shall or shall not be locked to the needle-bar substantially as described.

3. In a straight-bar-knitting machine the combination of the fixed presser-bar, the needle-bar having an up-and-down and a horizontal to-and-fro movement, the needles which can either move or not move with the needle-bar, the catches which govern whether the needles shall or shall not partake of all the needle-bar's movements and the Jacquard barrel acting on the catches substantially as described.

4. In a straight-bar-knitting machine the combination of the fixed presser-bar, the needle-bar having an up-and-down and hori-

zontal to-and-fro movement, the needles, the catches the Jacquard barrel which controls whether the needles shall or shall not be locked to the needle-bar and whose axes can slide in grooves or guides on the needle-bar so that in one direction of the needle-bar's movement the Jacquard barrel is carried to and fro with it and in the other direction can be moved independently of the needle-bars substantially as described.

5. In a straight-bar-knitting machine the combination of the fixed presser-bar, the needle-bar having an up-and-down and a horizontal to-and-fro movement, the needles capable of sliding endwise in grooves in the needle-bar, the catches for locking the needles to the needle-bar, the Jacquard barrel for acting on these catches and means for moving the Jacquard barrel toward and away from the tail ends of the catches substantially as described.

6. In a straight-bar-knitting machine the combination of the fixed presser-bar, the needle-bar having an up-and-down and a horizontal to-and-fro movement, the needles capable of sliding endwise in grooves in the needle-bar and catches for controlling whether the needles shall or shall not move along with the needle-bar substantially as described.

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Witnesses:

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