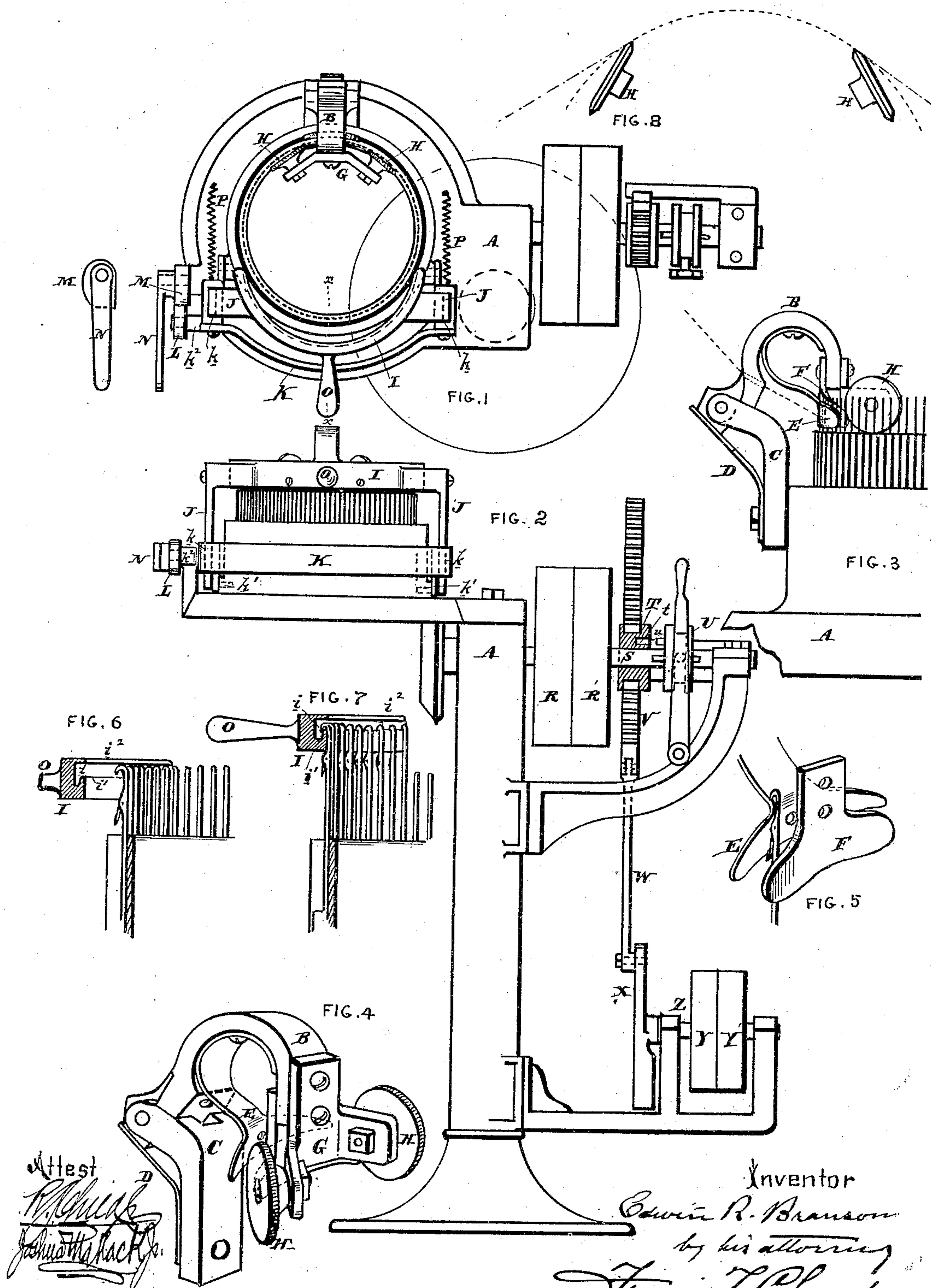


(No Model.)

E. R. BRANSON.
CIRCULAR KNITTING MACHINE.

No. 445,690.

Patented Feb. 3, 1891.



UNITED STATES PATENT OFFICE.

EDWIN R. BRANSON, OF PHILADELPHIA, PENNSYLVANIA.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 445,690, dated February 3, 1891.

Application filed January 18, 1887. Serial No. 224,734. (No model.)

To all whom it may concern:

Be it known that I, EDWIN R. BRANSON, of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Circular-Knitting Machines, of which the following is a true and exact description, due reference being had to the accompanying drawings, which form part hereof.

My invention relates to circular-knitting machines, and has for its object to provide improved means for holding down the web in the place where the needles pass through the loops to free the latches preparatory to the formation of new loops and to keep the web in place while the operation of forming the new loops takes place; to provide improved means for lifting the necessary number of needles out of operation preparatory to changing the circular movement of the machine to a reciprocating movement, as when the heel or toe of a stocking is being "turned," and to provide improved devices for giving the reciprocating motion to the machine. These objects I attain by means of the devices hereinafter described, and which are illustrated in the drawings forming part of this specification, in which—

Figure 1 is a plan view of of a knitting-machine embodying my improvements; Fig. 2, an elevation of the same, showing my reciprocating device in section; Fig. 3, a side view of part of the machine showing my device for holding down the web as attached to the machine; Fig. 4, a perspective view of the said device apart from the machine; Fig. 5, a perspective view of the yarn-carrier and the stationary part of my device for holding down the web; Fig. 6, a sectional view on the line $x x$, Fig. 1, showing the device for raising and lowering the needles as operating to press the needles down into their operative position, while Fig. 7 is a similar view showing the device in the act of raising the needles out of operation, and Fig. 8 shows the angular position of the pressure-wheels in relation to the needle-cylinder.

A is the standard supporting the machine and its operative mechanism. As this and the general operative parts of the machine form no part of my invention, but may be of

any approved kind, it is not necessary to describe them.

B is a bent arm hinged to a standard C, which is secured to the frame of the machine, the arm B being curved upward sufficiently to allow the needles to pass freely under it when raised, as shown in Fig. 7.

D is a spring which operates on the end of the arm B, either to press it down toward the web or to hold it up out of the way when it is desired.

E is the yarn-carrier, which is secured to the arm B and placed in relation to the work, as is usual.

F is the fixed presser for keeping the web in place during the upward movement of the needles.

G is a branched support having at the end of each arm a bearing for a pressure-wheel H.

H H are pressure-wheels, preferably of a partly-yielding material, such as rubber, and they are set so that their inner edges alone come in contact with the web, the plane of the wheels preferably forming an angle of about thirty degrees with the tangent of the needle-cylinder at their point of contact with it, as shown in Fig. 8. By this construction the wheel H, which meets the web after it has passed under the stationary presser F, is constantly acting to pull it down tight against the edge of the needle-cylinder, and the angular position of the wheel H on the other side of F is such that its rotation does not sensibly tend to raise the web away from the cylinder, as is the case with the pressure-wheels heretofore proposed. The use of rubber pressure-wheels or wheels of a similar character acting with an elastic pressing force upon the web is also advantageous, as the serrated metal wheels which have been used are found to injure the web.

I is a metal segment of the same curvature as that of the needles. Its inner face is hollowed out into the annular cavity i , the opening in its face being somewhat deeper than the depth of the crooked ends of the needles. The lower edge i' of the cavity i is a sharp upwardly-turned edge adapted to enter the hooked ends of the needles and engage them. The upper edge i'' , on the other hand, is flat

and adapted to pass over the curved ends of the needles and press upon them.

J J are metal guides secured to the hollow segment I, and having supporting-bearings k k , in which they can move up and down. These bearings k k are secured to a supporting-frame K, which is pivoted at k' k' to the frame of the machine, so that it can rock to and fro upon it.

k^2 is an arm projecting to one side of the frame K, and carrying a wheel L at its extremity.

M is a cam pivoted upon the frame of the machine and actuated by a lever N.

O is a handle secured to the hollow segment I, and P P are springs which tend to pull the frame K and segment I toward the needles, the function of the cam M being to counteract this action of the springs and hold the segment I out of contact with the needles except when it is desired to act upon them, when a turn of the lever N permits the frame to turn and the segment to engage the needles. Thus when it is desired to raise the needles, the segment I being in its usual lowest position, the cam M is turned so as to release the frame, which at once turns toward the needles and brings the annular opening of the segment I into the position with respect to the needle-hooks shown in Fig. 6. The segment I is then raised by means of the handle O, or in any convenient manner, and the edge i' , engaging with the hooks, causes all the needles embraced in its segment to rise with it until they are at the desired height, when, after a slight downward movement of the segment I to free the edge i' from the needle-hooks, the cam is turned so as to again throw the segment I away from the needles, and the machine is thus at once and with but little trouble ready for a change of motion. When it is desired to bring the elevated needles again into operation, the operation is reversed, the edge flange i^2 serving to press the needles back into place.

It will be evident that the segment I may be usefully employed simply as a device to press the elevated needles back to their operative position after they have been raised by any plan or device, the edge i' being then dispensed with and only the flange i^2 retained, or, on the other hand, the segment I may have the edge i' only and be used alone to elevate the needles, their return being effected by any convenient means or device.

R R' are fast and loose pulleys upon the actuating-shaft S.

T is a toothed wheel running freely on the shaft S.

U is a grip keyed to the shaft S by means of a slot and free to move backward and forward upon it, its motion being governed by a lever U', as shown. This grip U has a pin u or other engaging device, which can enter a hole t in the toothed wheel T and cause it to revolve with the shaft.

V is a toothed bar or rack which is engaged

with the toothed wheel T, and is actuated by means of a connecting-rod W and crank X, attached to a shaft Z, having fast and loose pulleys Y Y'.

When it is desired to change the circular movement of the machine to a reciprocating one, the driving-belt is moved to the loose pulley R', the grip U moved forward until it engages with the toothed wheel T, and the shaft Z being then set in motion, the rack V moving up and down and rotating the wheel T and the shaft S, now connected with it, first in one direction and then in another, causes the machine to reciprocate.

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

1. In combination with the cylinder of a circular-knitting machine, a wheel-support and one or more presser-wheels H H secured thereto at an angle to the cylinder, substantially as and for the purpose specified.

2. In combination with the cylinder of a circular-knitting machine, a wheel-support and one or more presser-wheels H H, made of rubber or other elastic material and secured to the support so as to be at an angle to the cylinder, substantially as and for the purpose specified.

3. In combination with the cylinder of a circular-knitting machine, a wheel-support, presser-wheels H H, secured thereto at an angle to the cylinder, and the stationary web-retaining device F, substantially as and for the purpose specified.

4. The combination, with the needle-cylinder, of a wheel-support, the presser-wheels H H, secured thereto, and the stationary work-retaining device F, with the hinged arm B and the spring D, substantially as and for the purpose specified.

5. The combination, with the needle-cylinder, of a wheel-support, the presser-wheels H H, secured thereto, and stationary work-retaining device F, with the hinged arm B, having the yarn-carrier E and the spring D, substantially as and for the purpose specified.

6. In combination with the needle-cylinder, the segment I, having an upwardly-turned edge i' , and an oscillating extensible support for the segment, whereby it is sustained above the cylinder and in position to engage the needle-hooks, all substantially as and for the purpose specified.

7. In combination with the needle-cylinder, the segment I, having an inwardly-extending flange i^2 , and an oscillating extensible support for the segment, whereby it is sustained above the cylinder and in position to engage the needle-heads, all substantially as and for the purpose specified.

8. In combination with the needle-cylinder, the segment I, having an upwardly-turned edge i' , and an inwardly-extending flange i^2 , and an oscillating extensible support for the segment, whereby it is sustained above the cylinder and in position to engage the needle-

hooks, all substantially as and for the purpose specified.

9. In combination with the needle-cylinder, the segment I, having an upwardly-extending flange i' and an inwardly-extending flange i^2 , an oscillating extensible support for the segment, whereby it is sustained above the cylinder and in position to engage the needle-heads, a spring P, arranged to draw the segment inward, and an adjustable stop M to counteract the said spring, all substantially as and for the purpose specified.

10. The combination, with the driving-shaft of a knitting-machine, of fast and loose pulleys R R', a loose gear-wheel T, and a longitudinally-movable grip or clutch U, all secured upon said shaft, a rack V, engaging gear-wheel T, and an actuating-crank X, connecting with said rack, all substantially as and for the purpose specified.

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Witnesses:

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FRANCIS T. CHAMBERS.