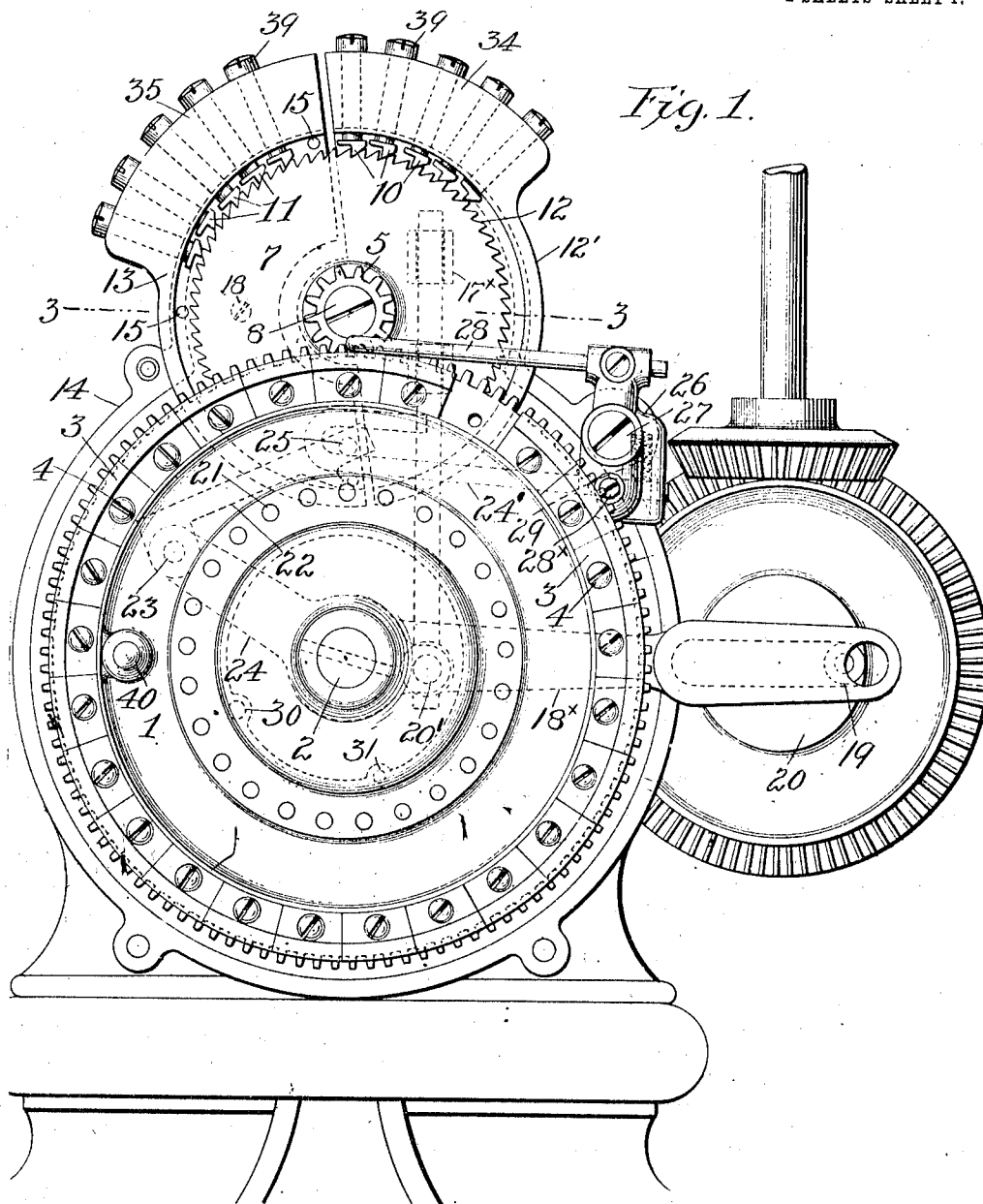


F. WILCOMB.
 PATTERN MECHANISM FOR KNITTING MACHINES.
 APPLICATION FILED NOV. 17, 1906. RENEWED NOV. 29, 1912.

1,054,478.

Patented Feb. 25, 1913.

2 SHEETS—SHEET 1.



Attest

C. S. Mason
 Edward N. Sartor

Inventor

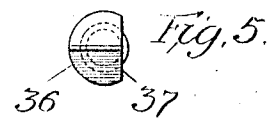
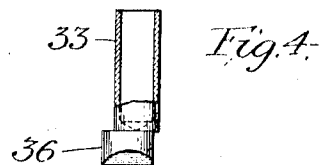
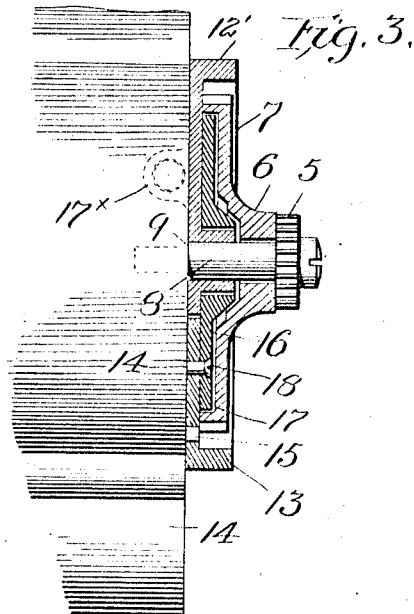
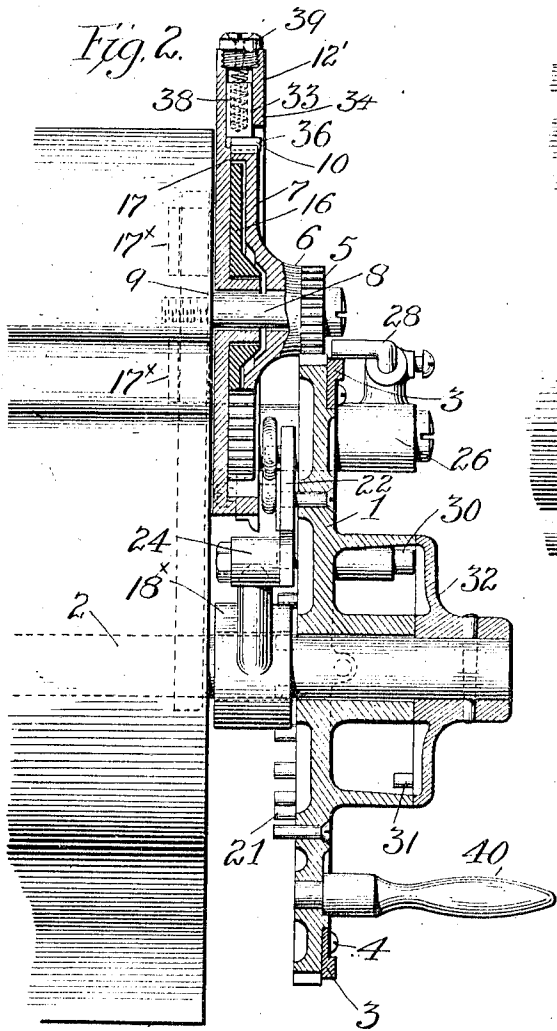
Frank Wilcomb
 by Spear, Middleton, Donahue & Spear
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Attest
C. S. Mason
Edward N. Eaton

Inventor
Frank Wilcomb
by Spear, Middleton, Donahue & Spear
Attys.

UNITED STATES PATENT OFFICE.

FRANK WILCOMB, OF NORRISTOWN, PENNSYLVANIA, ASSIGNOR TO WILCOMB MACHINE COMPANY, OF NORRISTOWN, PENNSYLVANIA, A CORPORATION.

PATTERN MECHANISM FOR KNITTING-MACHINES.

1,054,478.

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed November 17, 1906. Serial No. 343,899. Renewed November 29, 1912. Serial No. 734,193.

To all whom it may concern:

Be it known that I, FRANK WILCOMB, citizen of the United States, residing at Norristown, Pennsylvania, have invented certain new and useful Improvements in Pattern Mechanism for Knitting-Machines, of which the following is a specification.

My present invention relates to pattern mechanism for knitting machines, or more properly speaking, to measuring mechanism for securing the production by the machine of certain lengths of fabric of one kind, after which certain mechanism is started into operation to continue the knitting of a different form or kind of fabric, like, for instance, the making of a heel or toe after knitting the leg or foot or changing the stitch from one kind to another.

In some types of pattern mechanism the pattern member consists of an endless chain having at intervals, lugs or rollers for calling into action certain intermittent movements desired. The chain required is often very long and is objectionable for this and other reasons, and therefore the preferred form of pattern mechanism is that known as the chainless or wheel type.

My invention is an improvement in that class of pattern wheel mechanism, such for instance as is disclosed in Letters Patent of the United States, granted to F. B. Wildman #613346, Nov. 1, 1898.

I have aimed to produce a very simple, inexpensive construction so that the operator may set up the wheel for a certain pattern or length of fabric without necessarily calling for a high degree of technical skill. I employ a pattern wheel with a row of plates detachably connected to the wheel. These plates form a continuous concentric circle when all the plates are in place. The removal of a plate enables the pattern wheel to call into action the mechanical movements required to change the pattern. This wheel has a step by step movement of an unusually large number of steps. Taking the circumference of the wheel for one garment or article manufactured, it has, say, twice the number of steps that would be required in any one fabric with all the plates attached. The wheel also has a fast movement which enables the pattern wheel to be

rapidly revolved step by step, many times faster than its slow step by step movement. The removal of a plate calls the quick movement into action for changing the pattern.

The invention consists in the features, combination and arrangement of parts hereinafter described and particularly pointed out in the claims.

In the drawings, Figure 1 is a front view of the pattern mechanism. Fig. 2 a vertical sectional view looking from the left of Fig. 1, parts being in section. Fig. 3 is a plan view of a section on line 3-3 of Fig. 1, parts being shown in plan. Figs. 4 and 5 are detail views of one of the pawls.

In these drawings, 1 is the main pattern member which I have shown in the form of a wheel but which is not limited as to its form so far as the scope of certain features of this invention is concerned. This pattern wheel is loosely mounted on a shaft 2 carrying or connected with the parts to be controlled by said pattern mechanism. This pattern wheel is provided with a number of pattern blocks 3, fixed thereto by screws 4. These pattern blocks, as is well understood, are adapted and are so disposed on the pattern wheel, as to give the desired pattern or formation in the fabric.

The pattern wheel is given a slow or measuring movement through a pinion 5. This pinion is secured to the hub 6 of a slow motion or measuring wheel 7 and the wheel and pinion are journaled on a pin 8, shouldered at 9 and screwed into the frame. Step by step movement is imparted to the slow motion or measuring wheel by a series of pawls 10 and a series of detents 11. These are arranged to engage the ratchet teeth 12 of the measuring or slow motion wheel, being positioned one behind the other around the circumference of the wheel.

The pawls are mounted in a pawl carrier or plate 12', journaled on the pin 8, above mentioned, to which carrier oscillatory movement is imparted as will be hereinafter described. The pawls are five in number in the present case and the movement imparted to the series of pawls equals only one-fifth of a ratchet tooth and from an inspection of Fig. 1 it will be seen that only one pawl is effective at a time, the others being located

at different distances back on their respective teeth so that they, one after the other, will become effective, for as soon as the effectively positioned pawl moves the ratchet another pawl will become effective, and so the movement of the ratchet wheel is taken up by the pawls, one after the other, each one moving said wheel the distance of one-fifth of a tooth. By this arrangement a very slight step by step movement is imparted to the ratchet or measuring wheel without necessitating the use of fine ratchet teeth, which of course renders the machine delicate at this point and liable to be quickly affected by wear.

By the construction described, I secure a fine ratchet movement from a coarse tooth ratchet, and all the pawls and the detents are of uniform construction. Further, the measuring or slow motion wheel is by this arrangement of pawls kept narrow in width, rendering, to this extent, the machine more compact. The detents 11 are arranged in the same number and relation with respect to the ratchet teeth as are the pawls, and as in the case of the pawls only one detent is effective at a time, and said detents are brought into action in succession. The detents are supported in a plate or bracket 13 pinned to the frame 14 at 15. This bracket has a plate 16 secured thereto by the screw 18 which lies in the hollow rear side 17 of the ratchet wheel and which affords a bearing for the pawls and detents to prevent them from dropping out when the ratchet wheel is being assembled or when, for any reason, said wheel is removed.

The ratchet movement is given its oscillating movement by a pitman having a special connection with the said oscillating pawl carrier to eliminate inaccuracies ordinarily due to wear and particularly where pivot connections are employed. This pitman in the present case consists of a rod passing through a boss or bosses 17^x on the rear face of the pawl carrier wherein said rod has free reciprocatory movement. The lower end of the rod or pitman is connected pivotally to an operating lever 18^x at a point 20 below the center line of said lever. This lever has an oscillating movement imparted to it by a crank pin 19 on a disk 20 on the main shaft. The greater part of this motion is taken up by the pitman sliding through the boss and only the slight movement due to the lateral travel of the pivot 20⁷ is imparted to the pawl carrier. This pitman has a long bearing in the boss or bosses, and the advantage of this over a link connection is that wear will not effect the accuracy of the pawl carrier's movement as the vertical movement of the rod is a long one, while the vibrating movement is extremely small. The looseness which would develop in the pivoted link

connection where such small movement is imparted would be impracticable.

For giving the pattern wheel its quick movement for changing the pattern a series of ratchet teeth or pins 21 are carried on the rear face of the pattern wheel to be engaged at certain times by a pawl 22 pivoted at 23 to an arm 24 of the lever 18^x. This pawl is controlled in its position relative to the pins 21 by a loop or arm 24⁷ engaging a pin 25 projecting from the said pawl over the said arm or loop. This controlling arm is carried by a block or bracket 26 pivotally supported on the frame of the machine at 27 and carrying also a drop wire or arm 28 having its end bent and projecting over the rim of the pattern wheel to rest on the blocks 3 thereof. These blocks are set according to the pattern desired and when the pattern wheel brings a portion thereof having no block thereon to the drop wire, this is allowed to fall thus lowering the controlling or detaining arm of the pawl and allowing said pawl to engage one of the pins or teeth 21 with the result that said pawl will give the pattern wheel a movement equal to the segment represented by the missing block and should two or more blocks be missing, leaving an extended vacant space, the action of the pawl will continue until the drop wire is raised by the next block, when the quick movement of the pattern wheel will cease and the slow measuring movement of the pawls and ratchet wheel will continue. During the quick movement it will be understood that the teeth of the measuring ratchet wheel will simply slip by the pawls and detents. The downward movement of the drop wire is but slight and not so much as to prevent its lifting by the next pattern block.

In order to insure the full action of the quick motion pawl 22 and the maintaining of its grasp on the tooth for the full stroke I provide a yielding connection between the controlling arm 24⁷ and the drop wire or arm. This consists of a pivot 28^x between the controlling arm and the block or bracket 26 and a spring 29 bearing on the end of said controlling arm beyond the pivot. This connection will allow the drop wire to rise onto the periphery of the pattern block, while at the same time the quick acting pawl will maintain its connection with the pin of the pattern wheel to complete its full movement thereagainst. The movement of the pattern wheel is communicated to the shaft 2 to start the pattern or make the change in the fabric by a starter pin 30 on the pattern wheel striking against a pin 31 on the disk 32 pinned to the said shaft.

The pawls 10 and detents 11 are of like construction, each comprising a hollow cylindrical portion 33, slidably mounted in the overhanging portions 34, 35 of the oscil-

lating pawl carrier and the detent holder respectively. The pawls and detent have their teeth formed on enlarged heads 36 carried at the inner ends of the said cylindrical portions, said heads having each a flattened side at 37 bearing against the flat face of the part supporting the said pawl or detent, thus preventing the pawl from turning. The pawls and detents are pressed normally inwardly by springs 38 located in the hollow cylindrical portions and held in place by the screw caps 39. These caps have open centers through which the pawls and detents may be oiled. The pattern wheel may be turned by hand by grasping the handle 40. The pattern wheel may be constructed with any number of divisions.

When the starting pin of the pattern wheel comes in contact with the pin in the pin-holder disk a rotating movement is imparted to the shaft. This shaft will now be rotated, by other means not shown, any part of a complete revolution, when it will stop, waiting another impulse from the pattern wheel. Therefore for illustration if we desire to knit say 606 courses of knitting before starting any new movement like the making of heels and toes of stockings, there would be 6 plates attached to the pattern wheel. On the six hundred and seventh revolution of the machine the drop wire would fall into the space of the removed plates and the pattern wheel is rapidly moved into contact with the starting pin of the pin-holder on the shaft. When it has imparted a slight movement to that shaft the drop arm will be lifted by a plate and the wheel would rotate step by step on its slow movement while the shaft 2 would advance more rapidly until it is stopped, awaiting a further impulse by the pattern wheel. This operation is repeated at any desired number of intervals during the production of a garment of any kind, on a knitting machine.

While I prefer to use as the pattern member a wheel having the blocks or projections directly thereon, I do not wish to limit myself in this respect.

Where I refer to blocks, I mean the plates shown on the pattern wheel or any equivalent pins or projections.

I claim:—

1. In combination, in pattern mechanism for a knitting machine, a pattern wheel, a peripheral gear thereon, a pinion meshing with said gear, pawl and ratchet means on the axis of the pinion for turning the pinion slowly and means for giving the pattern wheel a quick movement, and connections for controlling said means from the pattern blocks, substantially as described.

2. In combination in a pattern mechanism for knitting machines, a pattern wheel carrying blocks, means for moving said pattern wheel slowly, a pawl for moving said

pattern wheel quickly, a drop wire or arm resting on the blocks and a yielding controlling connection between said drop arm and the quick motion pawl, substantially as described.

3. In combination, the pattern wheel carrying the blocks, means for giving it a slow motion, a pawl for giving it a quick motion, a drop arm engaging the blocks, a controlling arm, engaging the pawl, a bracket pivoted to the frame and to which the controlling arm and drop arm are connected and a spring to allow the controlling arm to yield, substantially as described.

4. In combination in pattern mechanism for knitting machines, a pattern wheel carrying blocks, means for giving the wheel a slow motion, a pawl for giving the pattern wheel a quick movement and yielding means for controlling the pawl in turn controlled by the blocks of the pattern wheel, substantially as described.

5. In combination in a pattern mechanism for knitting machines, a pattern wheel having pattern blocks and having also gear teeth thereon, means for giving said wheel a slow movement consisting of a pinion meshing with the gear on the pattern wheel, a ratchet wheel on the axis of the pinion, a pawl carrier oscillating about the axis of the pinion, a series of spring pawls on the carrier to engage the ratchet teeth, a series of spring detents, said pawls and likewise said detents being arranged at different points along the periphery of the wheel to lie in different relative positions respecting said teeth, and means for giving the pattern wheel a quick movement consisting of a reciprocating pawl, pins on the wheel to be engaged by the pawl, a controller to ride on the pattern blocks, and a connection between the controller and the pawl, substantially as described.

6. In combination in pattern mechanism for knitting machines, a frame, a pattern wheel carrying pattern blocks, and having gear teeth, a pinion meshing with said teeth, a ratchet wheel between the pinion and the frame and arranged axially therewith, an oscillating carrier pivoted on the axis of the ratchet wheel and between the same and the frame, a pawl arranged between the pattern wheel and the frame to give the pattern wheel its quick movement and means controlling said pawl from the pattern blocks, substantially as described.

7. In combination, a pattern wheel, a peripheral gear and pattern blocks thereon, a pinion for driving the gear, means for driving the pinion, the ratchet teeth on the rear side of the pattern wheel a pawl for giving the pattern wheel a quick motion, and means consisting of the drop member resting on the blocks and a connection extending therefrom alongside the pattern

wheel to the pawl for controlling the said pawl from the pattern blocks substantially as described.

8. In combination, in a pattern mechanism for knitting machines, a pattern member, a ratchet wheel for driving the same, a pawl carrier, a radially movable pawl, a radially movable detent and a plate having its edge arranged to afford a bearing for the inner end of the pawl and detent to prevent their dislodgement when the ratchet wheel is removed, substantially as described.

9. In combination in a pattern mechanism for knitting machines, a pattern member, a ratchet for driving the same, a pawl carrier having a portion overlying the periphery of the ratchet wheel, a pawl radially movable in said overhanging portion and having an enlarged head on its inner end with the pawl tooth formed thereon, said head being flattened to bear on the face or pawl carrier to prevent turning of the pawl, substantially as described.

10. In combination, in a pattern mechanism for knitting machines, a pattern member, a ratchet wheel for driving the same, a pawl and oscillating carrier and means for oscillating said carrier consisting of the pitman having the sliding connection therewith and having also slight lateral movement, substantially as described.

11. In combination, in pattern mechanism

for knitting machines, a pattern member, a ratchet wheel connected to said pattern member to drive the same, a pawl and an oscillating pawl carrier, a pivoted lever and a pitman pivoted thereto and having a sliding connection with the pawl carrier, substantially as described.

12. In combination, a pattern wheel, a lever, slow moving driving mechanism for the wheel, comprising the ratchet wheel, the pawl and oscillating pawl carrier quick moving driving mechanism comprising the pawl, both the oscillating pawl carrier and the quick moving pawl being connected to and operated by the said lever, substantially as described.

13. In combination, in a pattern mechanism for knitting machines, a pattern wheel, a ratchet with connections thereto for giving said wheel a slow motion, a quick motion pawl, a pawl and pawl carrier for the ratchet wheel, a two armed lever a pitman connection between one arm of said lever and the pawl carrier, said lever carrying the quick acting pawl on its other arm.

In testimony whereof, I affix my signature in presence of two witnesses.

FRANK WILCOMB.

Witnesses:

WM. F. DANNEHOWER,
CHAS. KOHLER.