

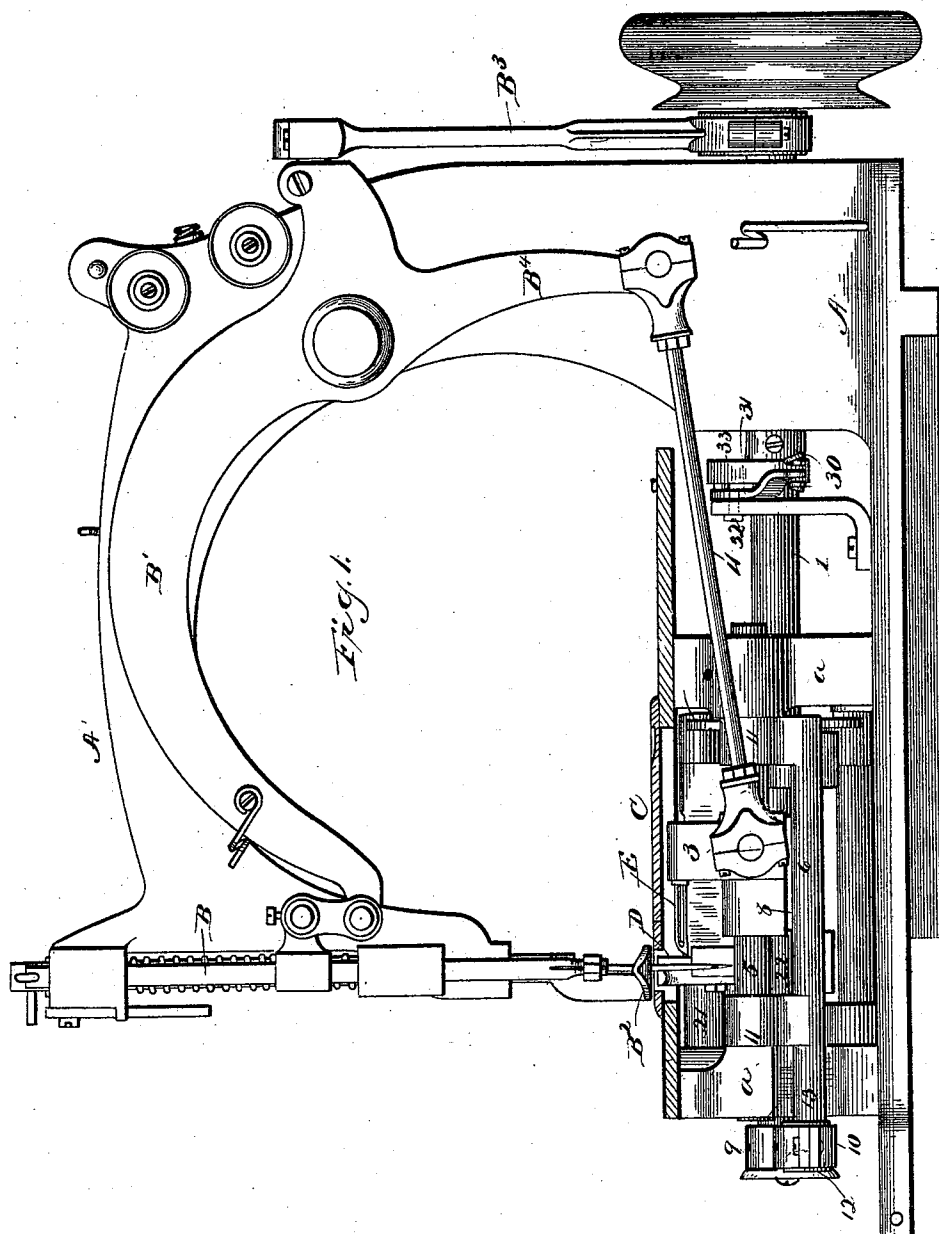
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3 Sheets—Sheet 1.

J. C. GOODWIN.
SEWING MACHINE.

No. 517,141.

Patented Mar. 27, 1894.



Witnesses

J. M. Fowler Jr.
Thomas Durant

Inventor
Julius C. Goodwin,

By Clump & Clench
Mr. Attorneys

(No Model.)

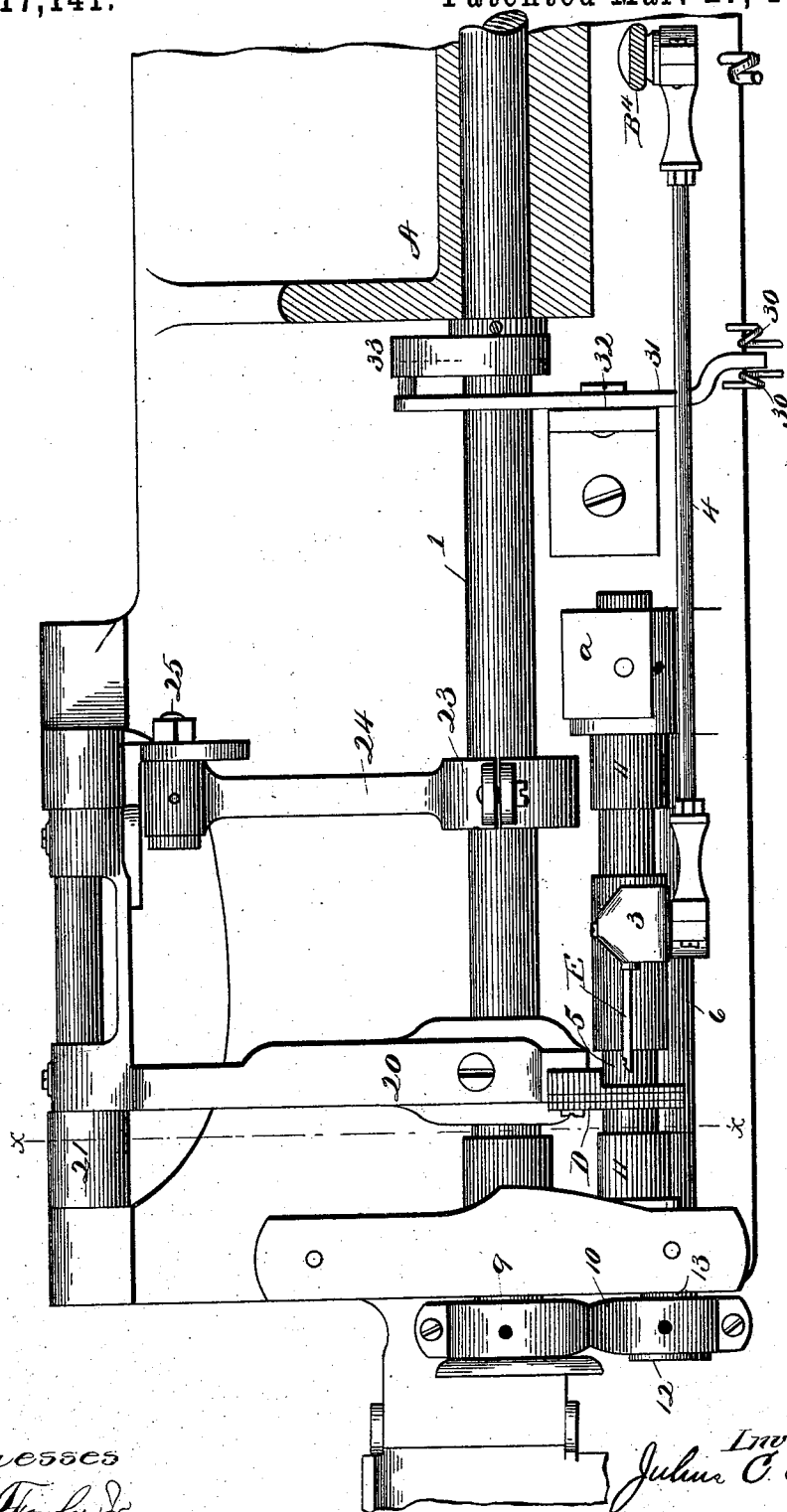
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Fig. 2.



Witnesses

J. M. Taylor Jr.
Thomas Durant

Inventor
Julius C. Goodwin

By *Clough & Clough*
Attorneys

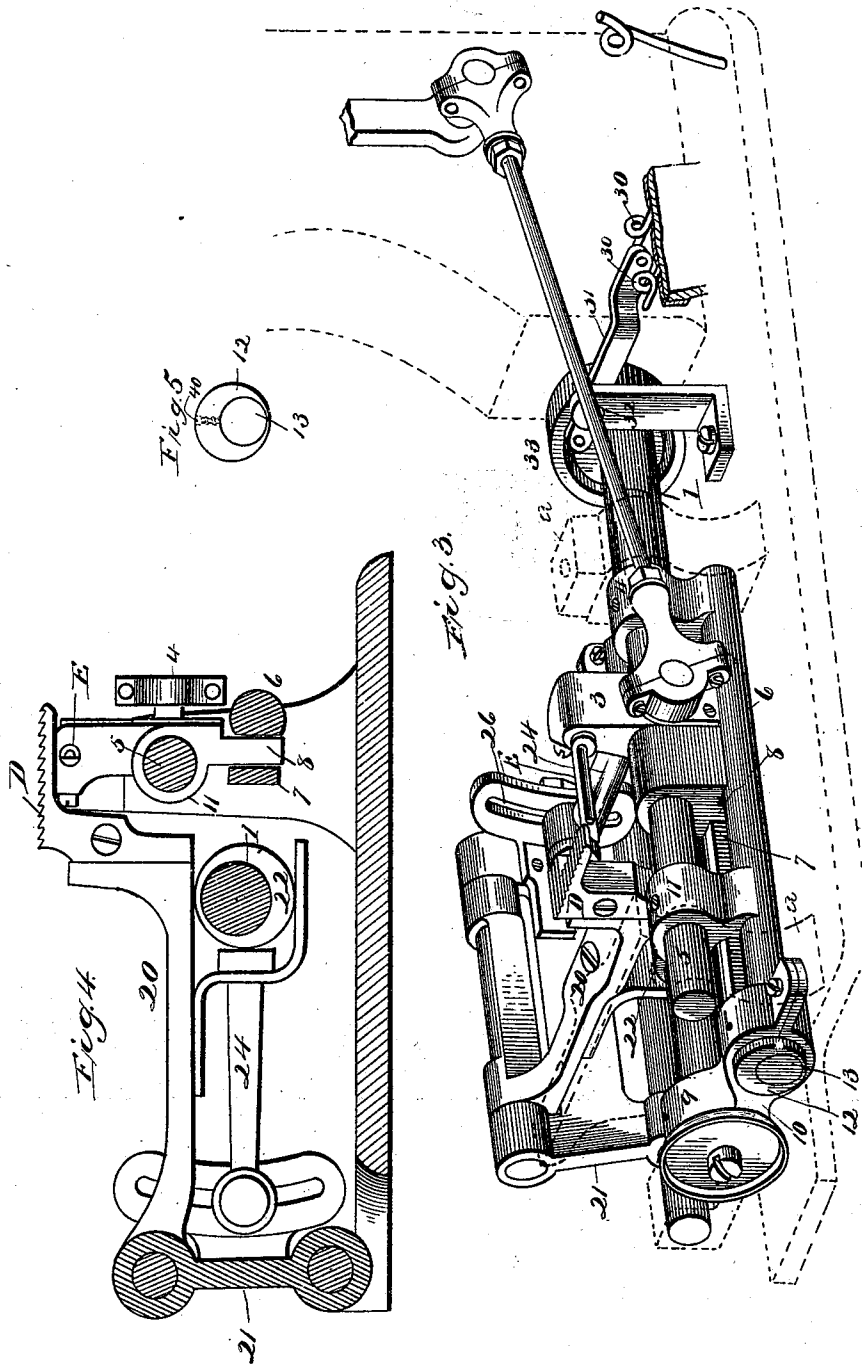
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J. M. Fowler Jr.
Thomas Durant

Inventor
Julius C. Goodwin

By Charles & Clewah
his Attorneys

UNITED STATES PATENT OFFICE.

JULIUS C. GOODWIN, OF PHILADELPHIA, PENNSYLVANIA.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 517,141, dated March 27, 1894.

Application filed October 26, 1893. Serial No. 489,202. (No model.)

To all whom it may concern:

Be it known that I, JULIUS C. GOODWIN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

My present invention relates to improvements in sewing machines which are specially arranged to form what is known as the double chain stitch, by the co-operative action of a reciprocating thread carrying needle and a reciprocating thread carrying looper, and it consists in certain new and improved constructions, combinations and arrangements of mechanism for guiding, adjusting and operating the looper and feeding devices and controlling the lower thread, the object being to produce a simple but efficient machine adapted to be run continuously at a high rate of speed, all as hereinafter fully described and pointed out in the claims.

In the drawings: Figure 1 is a front elevation of the machine, the work plate being partially broken away to uncover the looper mechanism. Fig. 2 is a plan view of the working parts below the work plate. Fig. 3 is a view in perspective showing the looper, take-up and feeding mechanisms, a portion of the frame being indicated by dotted lines. Fig. 4 is a sectional view of the line *x-x*, Fig. 2. Fig. 5 is a detail view showing adjustable eccentric bearing.

Similar letters and numerals of reference in the several figures indicate the same parts.

The frame and upper portion of the machine including the needle-operating devices, tensions and take-up for the upper thread, presser foot, &c., may be of any desired or approved pattern, and they are here shown merely to illustrate one embodiment of my present invention.

A is the main frame provided with the usual overhanging arm or goose neck A' in or on which is supported the needle bar B, needle lever B', presser foot B², and the tension and take-up devices. The needle lever B' is driven in the usual manner by a pitman

B³ interposed between and connecting an eccentric on the main shaft 1 and a stud on the needle-lever.

C is the work plate, D the feed-dog and E the looper.

In forming the double chain stitch the looper is arranged to move forward on one side of the needle and back on the opposite side, in order that the needle, as it descends below the work plate, may pass through a loop or bight of the lower thread on one side of the looper, while the latter is being retracted, and, as the needle begins to ascend, the looper will advance and pass through a loop or bight of the upper thread carried by the needle.

It is of the utmost importance that the movements of the looper should be accurately timed and controlled; this is more especially necessary when the machine is to be run at a high rate of speed, and unless special provision is made to resist and overcome the disturbing effects of inertia and momentum, which become active factors at high speeds, and to resist the wear of the guiding surfaces, the slight departures from the correct movements of the looper will render the stitch-forming operation irregular and unreliable.

One object sought to be accomplished by my present invention is to provide a simple and reliable looper actuating mechanism of great endurance and strength, by which the looper can be guided and controlled so as to traverse in a given path with the minimum lost motion or departure from the true line. With this end in view the looper-carrier 3 is mounted to reciprocate in a plane substantially parallel with the looper and at right angles to the needle. Its longitudinal reciprocations in a horizontal plane are preferably produced by its attachment to the depending arm B⁴ of the needle-lever, through a rod 4, there being a ball joint formed at the points of attachment to the needle-lever and looper carrier; while the said movements are guided and controlled by a bar 5 passing through the looper-carrier and supported at each end in bearings in the frame, as at *a*.

The lateral movements of the looper, for transferring it from one side to the other of the needle, are produced and controlled, through the agency of a rocking carrier-frame

6 pivoted to oscillate upon a center coincident with the axis of bar 5, and provided with a guide or way 7 for the reception of a wing or guide 8 on the looper-carrier, said wing extending laterally beyond the guide bar 5. The rocking carrier-frame receives an oscillatory motion from an eccentric 9 on the main shaft 1 and a pitman 10 engaging a pin on said carrier frame, the movement being transmitted to the reciprocating looper-carrier through the guide or way 7 in engagement with the wing 8. The preferred arrangement is one in which the carrier frame 6 is adjustably and removably secured to the guide bar 5, as by the arms 11 provided with sockets for the passage of said bar and set screws for attachment thereto, the projecting ends of the guide bar 5 being received in bearings formed in the uprights *a* of the frame. As thus constructed and arranged the guide-bar 5 partakes of the oscillatory motions of the carrier-frame, its ends forming the pivots, at the same time it performs the office of a guide or way upon which the looper carrier is free to reciprocate longitudinally of said bar in a plane at right angles to the plane of oscillation. As a result of the two motions the looper is caused to traverse an elliptical path of which the major axis, corresponding to the longitudinal reciprocating motion, is in a horizontal plane, while the minor axis, corresponding to the lateral oscillating movement in the arc of a circle of which the axis of guide bar 5 is the center; accurately speaking the figure is an ellipse developed upon the circumference of a cylinder, but the arc is so short that it may be regarded for all practical purposes as a flat ellipse.

Broad and enduring wearing surfaces are provided for the several moving parts and the oscillating and horizontal reciprocating motions are positively produced and controlled in both directions. The range or extent of motion of the looper is just sufficient to produce the desired effect of interlooping the threads, the looper moving in a horizontal plane close to the work plate. The thrust and pull of the rod 4 is received by the looper carrier in a line substantially parallel with the guide bar 5, and the long bearing which the looper-carrier has on said bar effectually prevents the point of the looper from being deflected laterally.

Lateral adjustment of the looper, to accommodate different size needles, is effected by increasing or diminishing the distance between the eccentric 9 and the carrier-frame 6, and this can conveniently be accomplished by interposing an eccentric 12 between the pin 13 on the carrier frame and the pitman 10, said eccentric being adjustably secured to the pin by a set screw 40 or equivalent fastening so that it can be turned thereon.

The feed-dog D is secured to the feed-bar 20 whose rear end is pivoted to an upright link 21, while its front end rests upon an elevating cam 22 on main shaft 1. The hori-

zontal reciprocating movements of the feed-dog are derived from a cam or eccentric 23 on main shaft 1 and a pitman 24 whose rear end is attached to a pin 25 adjustably secured in a slot 26 formed in a plate or arm attached to the upright link 21. By adjusting the pin 25 to a position more or less remote from the pivot or point at which the link 21 is connected to the frame of the machine, the extent of motion of the feed-bar, as derived from the eccentric 23, can be accurately adjusted, and thus the feed movement can be readily varied. The connections are such that a positive motion in each direction is given the feed-dog.

It is very desirable that in machines of this kind a take up should be provided for the lower thread, and that the same amount and degree of motion should be given the thread whether the machine is running fast or slow. To accomplish this result the lower thread is conducted through or sustained by suitable eyes or supports 30 and through an eye formed in a lever 31 pivoted as at 32 and provided with a stud or projection engaging the walls of a face cam 33 on the main shaft. The movements given the take-up lever synchronize with those of the looper and are positive in both directions, hence there can be no racing or overrunning of the take-up when the machine is run at its greatest speed.

Taken as a whole, the machine is extremely simple in construction at the same time it is effective in operation and this is due in part at least, to the improved means for supporting and guiding the looper-carrier, whereby the extent of motion given the looper is reduced to the minimum, and the destructive effects of the vibrational motions of the parts, resulting in their rupture or springing, are almost entirely overcome by mounting the looper in a carrier guided to reciprocate upon ways, instead of upon a pivot.

Having thus described my invention, what I claim as new is—

1. In a sewing machine, such as described, the combination with the looper of a looper-carrier provided with a laterally projecting guide or wing, a guide bar upon which the looper-carrier reciprocates longitudinally, and a carrier-frame provided with a way to receive the wing or guide on the looper-carrier, said carrier-frame being guided to reciprocate transversely of the guide-bar while the looper carrier reciprocates longitudinally of said bar, whereby the looper carrier is caused to reciprocate longitudinally of its guide and at the same time is swung laterally upon a center coincident with the axis of the guide bar, causing the looper to traverse an orbit in the plane of a segment of a cylinder whose center is the axis of the guide-rod, substantially as described.

2. In a sewing machine, such as described, the combination with the looper, of a guide bar, a looper-carrier mounted to reciprocate longitudinally of the guide-bar, and a carrier

frame pivoted to swing laterally of the guide-bar in a plane parallel with the axis of the guide bar, said carrier-frame being provided with a way or guide engaging a projection or wing upon the looper-carrier; substantially as described.

3. In a sewing machine, such as described, the combination with the needle, work-plate and looper, of a guide mounted in fixed bearings on the frame and standing substantially parallel with the work-plate, a looper-carrier mounted to reciprocate longitudinally of the guide bar, and a carrier frame reciprocating laterally of the guide-bar and engaging the looper-carrier to oscillate the latter about the axis of the guide-bar; substantially as described.

4. In a sewing machine, such as described, the combination with the looper, of a guide-bar supported in fixed bearings, a looper-carrier mounted to reciprocate longitudinally of said guide-bar, a carrier frame pivotally supported to oscillate laterally of the guide bar in a plane parallel therewith, and a sliding connection between the reciprocating looper-carrier and the oscillating carrier-frame, whereby the motion of the looper is controlled in one direction by the guide-bar and in the other, by the oscillating carrier-frame, substantially as described.

5. In a sewing machine, such as described, the combination with the needle and looper, of the looper-carrier; a guide bar for said looper-carrier mounted in bearings; a carrier frame secured to said guide-bar and provided

with a guide or way engaging the looper-carrier; a connection between the main shaft and said carrier-frame operating to oscillate the latter and the guide-bar; and a connection between the needle lever and looper-carrier operating to reciprocate the latter longitudinally upon the guide-bar; substantially as described.

6. In a sewing machine, such as described, the combination of the looper; the looper-carrier; the guide-bar supported in bearings and extending through the looper-carrier in a line substantially parallel with the looper; the carrier-frame provided with arms for attachment to the guide-bar and furnished with a guide way parallel therewith; a projection or wing on the looper-carrier engaging said guide-way; and actuating mechanisms connected to the looper-carrier and the carrier frame, respectively, for reciprocating the former and oscillating the latter; substantially as described.

7. In a sewing machine, such as described, the combination with the reciprocating looper carrier, and oscillating carrier frame, the driving eccentric, its pitman and the adjustable eccentric bearing interposed between said pitman and the carrier-frame, for adjusting the position of the looper; substantially as described.

JULIUS C. GOODWIN.

Witnesses:

JOS. W. GOVETT,

H. C. RIGHTMIRE.