(No Model.) 3 Sheets—Sheet 1.

W. A. POLMATEER.

SHUTTLE OPERATING MECHANISM FOR SEWING MACHINES.

No. 308,697. Patented Dec. 2, 1884.

Fig. 2.

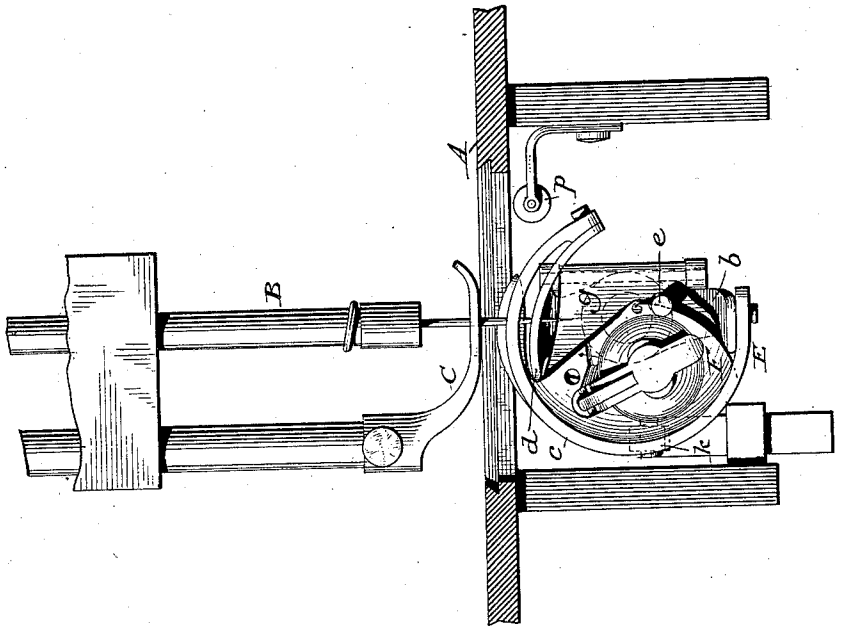
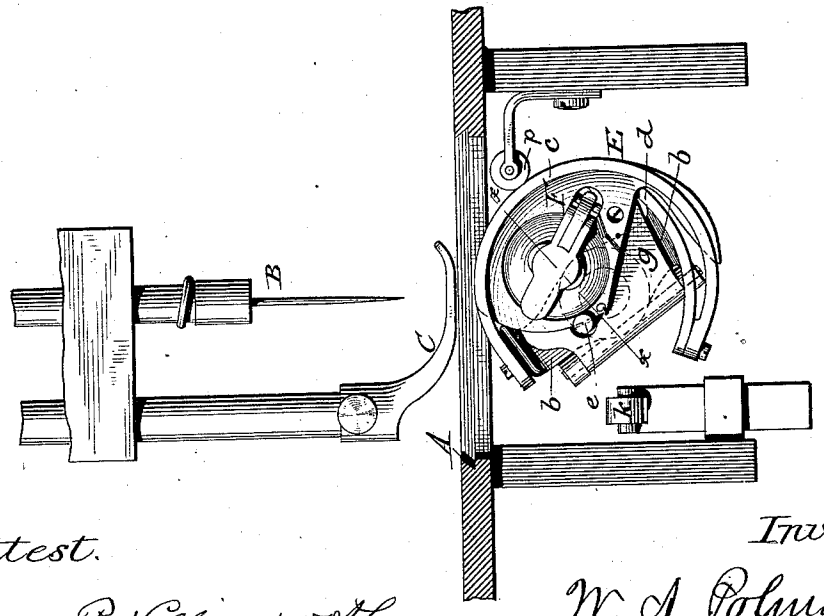


Fig. 1.



Attest.

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By his attorney

Philip T. Dodge.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 2.

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Fig. 6.

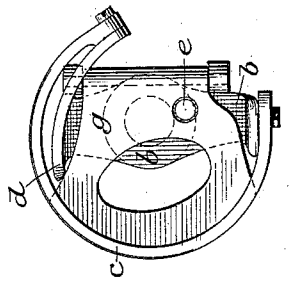

Fig. 7.

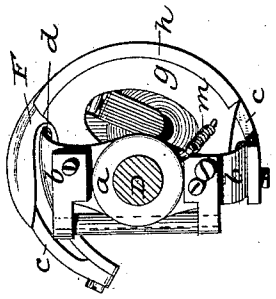

Fig. 5.

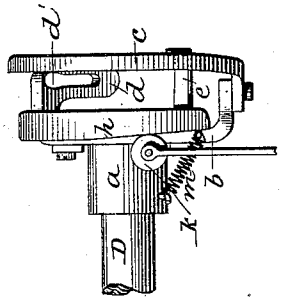

Fig. 4. on x-x

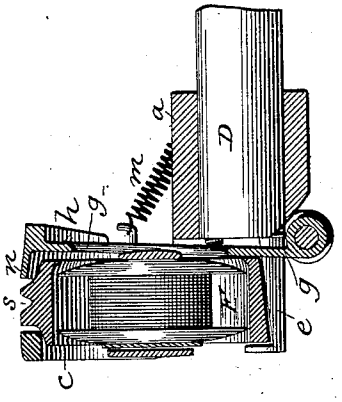

Fig. 3.

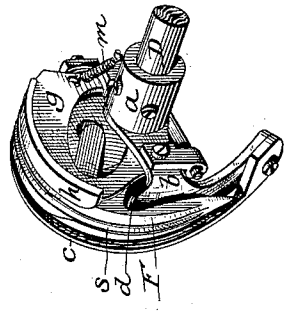

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Fig. 11.

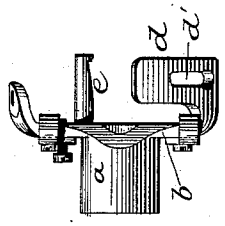


Fig. 15.

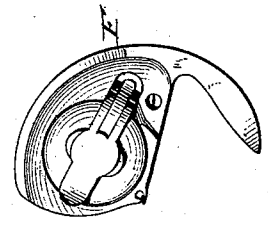


Fig. 10

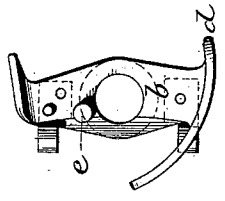


Fig. 14.

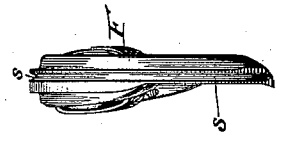


Fig. 9.

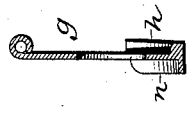


Fig. 12.

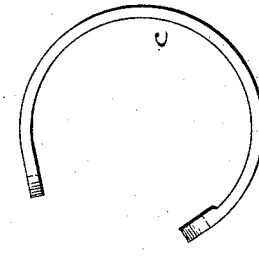


Fig. 13.

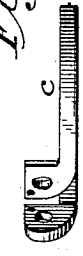
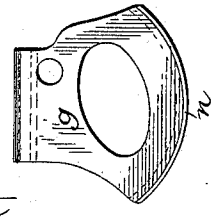


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM A. POLMATEER, OF JOHNSTOWN, NEW YORK, ASSIGNOR TO WILLIAM S. NORTHRUP, OF SAME PLACE.

SHUTTLE-OPERATING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 308,697, dated December 2, 1884.

Application filed November 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. POLMATEER, of Johnstown, in the county of Fulton and State of New York, have invented certain Improvements in Shuttle-Operating Mechanism for Sewing-Machines, of which the following is a specification.

The object of my invention is to dispense with the usual shuttle race or guide, and thus do away with the friction and wear on the shuttle which occurs in ordinary machines in consequence of the shuttle moving against the stationary surface of the guide or race.

To this end it consists in means whereby the shuttle is carried free from contact with stationary parts, guided positively in the proper direction to pass through the loop of the needle-thread, and subsequently released to permit the loop to pass around it and also around the bobbin carried therein.

In constructing my device a shuttle carrier or driver is formed in two parts, one of which is fixed to the shaft or other driving device, while the other is attached movably thereto. The shuttle is inserted between the fixed and movable parts, and is carried thereby. A stationary roller or equivalent device acts at the proper moment to close the movable part of the carrier toward the fixed part in order to clasp the shuttle firmly between the two, that its point may be presented in close proximity to the needle while passing the same.

My invention is susceptible of embodiment in various forms adapted for use in the different machines now known in the art without changing essentially the mode of action or departing from the limits of the invention.

In the accompanying drawings I have represented my invention in connection with a shuttle provided with a beak or neck and having an oscillatory movement in a circular path, the form and general mode of action being similar to that described in the patent to Miller and Diehl, October 8, 1878, No. 208,838.

Figures 1 and 2 represent side elevations of my shuttle mechanism embodied in a machine, the first figure showing the parts in the position which they occupy as the loop of the needle-thread completes its passage around the shuttle, and the second showing them in the position in which they appear at the instant that the point of the shuttle enters the loop. Fig. 3 is a perspective view of the shuttle, shuttle-carrier, and bobbin. Fig. 4 is a cross-section on the line *x x*, Fig. 1. Fig. 5 is an edge view of the shuttle-carrier and the roller for closing the same upon the shuttle, the shuttle being removed. Fig. 6 represents an outside face view of the same; Fig. 7, an inside face view of the same. Figs. 8 and 9 are respectively a side view and a cross-section of the movable portion of the shuttle-carrier. Figs. 10 and 11 are respectively an outside face view and an edge view with that portion of the shuttle-carrier which is fixed to the driver-shaft. Figs. 12 and 13 are respectively a side view and an edge view of the rim or peripheral portion of the shuttle-carrier. Figs. 14 and 15 are respectively an edge and a side view of the shuttle.

Referring to the drawings, A represents the bed-plate of the machine; B, the vertical reciprocating needle; C, the presser-foot; and D the horizontal rock-shaft located beneath the bed for the purpose of supporting and oscillating the shuttle-carrier, these parts being of ordinary construction.

E represents the oscillating shuttle carrier or driver, mounted at one side firmly upon the end of the shaft D, as plainly represented in the various figures. This shuttle-carrier consists of two parts, one fixed and the other movable in relation to the driving-shaft D. The fixed portion consists of a hub, *a*, having at right angles to its axis a plate or arm, *b*, the two extremities of which are secured firmly to a rim, *c*, of substantially semicircular form, this rim being plainly represented in Figs. 12 and 13. The ends of the plate *b* are projected laterally beyond its face, and it is to these projecting ends that the rim *c* is secured, as shown, so that the face of the plate and the rim stand in parallel vertical planes separated a sufficient distance to admit the shuttle between them.

The shuttle F (plainly represented in Figs. 14 and 15) is of essentially the same form as in the Patent No. 208,838, before referred to.

It is of a size and form adapted to fit within the rim *c*, between the inner face of said rim and the face of the plate *b*, in the manner plainly represented in Figs. 1 to 4, the shuttle being constructed, as shown, with a peripheral shoulder or groove to fit within the rim, in order to prevent its escape in a radial direction.

For the purpose of imparting the rotary motion to the shuttle, the carrier-plate *b* is provided with a fixed stud, *e*, to act behind the heel of the shuttle, and with a projecting arm or nose, *d*, to act within the neck of the shuttle to turn the same in a backward direction, as plainly represented in the several figures. The arm *d* is provided with a slot, *d'*, through which the needle descends to present its thread to the point of the shuttle.

To the outer face of the plate *b*, between said plate and the rim *c*, I hinge a movable plate, *g*, of the form represented in Figs. 8 and 9, this plate being designed to bear against the inner side of the shuttle for the purpose of retaining the same in position and clamping it firmly against the inner face of the rim *c*. In the normal condition of the parts the shuttle F lies loosely between the rim and plate, sufficient space existing between the parts to permit the loop of the needle-thread to pass freely over and around the shuttle, in order that it may encircle or engage the bobbin-thread in a manner well understood by those familiar with this art.

In order that the point of the shuttle may be certain to enter the loop of the needle-thread, it is necessary that the shuttle shall be locked firmly in position within the carrier during the instant that its point is passing the needle. It is for this purpose that the plate *g* is employed. On its rear face the plate is provided with a peripheral inclined flange, *h*, designed to be acted upon by a roller or equivalent device, *k*, which is attached to an elastic arm or other suitable support secured to the frame of the machine, as plainly represented in Figs. 1, 2, 4, and 5. During the forward movement of the shuttle, while the loop of the needle-thread is passing around the same, the roller ceases to act upon the movable plate, which is carried forward therefrom, as represented in Fig. 5; but during the backward movement of the carrier and shuttle the roller bears upon the edge of the plate *g*, as represented in Figs. 2 and 4, forcing the same outward against the inner side of the shuttle, which is thus held securely between the plate and the rim *c*. The pressure of the roller continues during the forward movement of the shuttle until after its point has entered the needle-thread. It will thus be seen, to recapitulate, that the shuttle is automatically subjected to and relieved from the pressure of the plate *g* during each backward and forward movement; that during the time the point of the shuttle is entering the thread the shuttle is clamped and held firmly within the carrier, but that during the remaining portion of its movement it is left free within the carrier, in order that the thread may pass around it without resistance.

For the purpose of retracting the clamping-plate *g* when relieved from the action of the pressure device, I connect thereto a spring, *m*, having its rear end attached to the hub *a*. This spring serves also the additional purpose of preventing the parts from chattering or vibrating in a noisy manner.

The clamping-plate is provided on its inner face with a peripheral flange, *n*, to engage over the peripheral shoulder or recess of the shuttle, and thus co-operate with the rim *c* on the opposite side to hold the shuttle in place in the manner represented in Fig. 4, the space between this lip and the rim when the clamping-plate is in its backward position being such that the escape of the shuttle in a radial direction is prevented.

It is to be noted that the carrier supports and drives the shuttle without contact with stationary parts, and consequently the friction and wear which ordinarily occur upon the shuttle are avoided.

The roller *k* may be sustained in any suitable manner; or, in place of the roller, a fixed arm or pressure device of any suitable form may be employed, the roller being advantageous, however, in that it reduces the friction to a minimum. It is preferred to connect the arm in which the roller is supported adjustably to the frame by extending the same through a slotted stud, as represented in the drawings, or in any other manner which will admit of the roller being raised and lowered. By this adjustment the operator will be enabled to change the time at which the pressure is applied to the shuttle.

In order to still further reduce the amount of power required to drive the parts and to guide them properly in their movements, I propose to employ, in connection with the periphery of the shuttle, a depressing roller, arm, or equivalent device, against which the shuttle may travel during the time that the loop is being passed around it, the roller tending to hold the shuttle downward against the lifting-strain exerted thereon by the loop of the needle-thread passing thereunder, so as to hold the top of the shuttle away from the top of the shuttle-carrier, and thus permit the thread to pass freely between the two. The employment of a roller in place of a stationary arm is preferred, for the reason that it operates with less friction. This roller (represented at *p*, Figs. 1 and 2) is secured to a supporting-arm on the frame, and is constructed with a sharp edge, which enters a corresponding groove, *s*, formed in the circumference of the shuttle, as plainly represented in Figs. 3, 4, and 14. It will be observed that the shuttle is in contact with the roller during a portion only of its movement, (see Figs. 1 and 2,) so that unnecessary friction is avoided. The

roller is carried by an arm, which is slotted and secured to the frame by means of a screw as represented, in order that the position of the roller may be varied, if required.

While I have described in this specification the clamping-plate *g* as being hinged to the fixed part of the shuttle-carrier, it is to be understood that it may be attached thereto by sliding connections or otherwise, secured in place in any suitable manner which will admit of its being moved to and from the shuttle.

I am aware that many shuttle-drivers which carry the shuttle in contact with a stationary guide or race on one side are provided with springs and with spring-actuated arms to hold the shuttle down therein and to permit its removal from the top when required. These devices have no bearing whatever on my invention, inasmuch as the drivers do not support and carry the shuttle independently of a race.

It is to be noted as a peculiarity of my construction that the shuttle is embraced and held between the two parts of the carrier in such manner as to receive support and motion wholly therefrom, no race or guide whatever being necessary.

Having thus described my invention, what I claim is—

1. The combination of the rock-shaft, the plate fixed thereto and provided with a peripheral rim to sustain the shuttle, the hinged plate provided with an inclined surface, the retracting-spring, and the fixed roller to act upon the inclined surface, as described and shown.

2. In a sewing-machine, the combination of a reciprocating eye-pointed needle the rotary shuttle-carrier consisting of the two parts adapted to receive the shuttle between them, one of said parts movable to and from the other, as described, and a stationary operating device, substantially as described, to force the movable part of the carrier against the shuttle at the instant that the point of the shuttle is passing the needle.

3. In a shuttle-carrier, the combination of the plate *b*, provided with a stud, *e*, arm *d*, and rim *c*, fixed thereto, the hinged plate *g*, provided with the peripheral flanges on its two faces, and a fixed roller, *k*, adapted to act upon the outer face, as described.

4. The shuttle-carrier consisting of the two parts hinged together and adapted to receive and carry the shuttle between them without the assistance of a fixed race or guide, in combination with the spring and the stationary stud or roller, arranged as described and shown, whereby the carrier is caused to alternately and automatically clasp and release the shuttle while retaining the same therein.

5. The combination, substantially as described and shown, of the oscillating shuttle-carrier, the shuttle confined therein and carried wholly thereby without the assistance of the race, and the stationary depressing device adapted to act upon the periphery of the shuttle, whereby the shuttle is automatically and momentarily depressed within the carrier to permit the passage of the thread between the top of the shuttle and the shuttle-carrier.

6. In combination with a shuttle having the peripheral groove or guide, the stationary roller adapted to engage therewith and prevent lateral movement of the shuttle.

WM. A. POLMATEER.

Witnesses:
ANDREW J. NELLIS,
J. LEONARD NORTHRUP.