(No Model.)

W. A. POLMATEER.

SEWING MACHINE.

No. 329,484. Patented Nov. 3, 1885.

Fig. 1

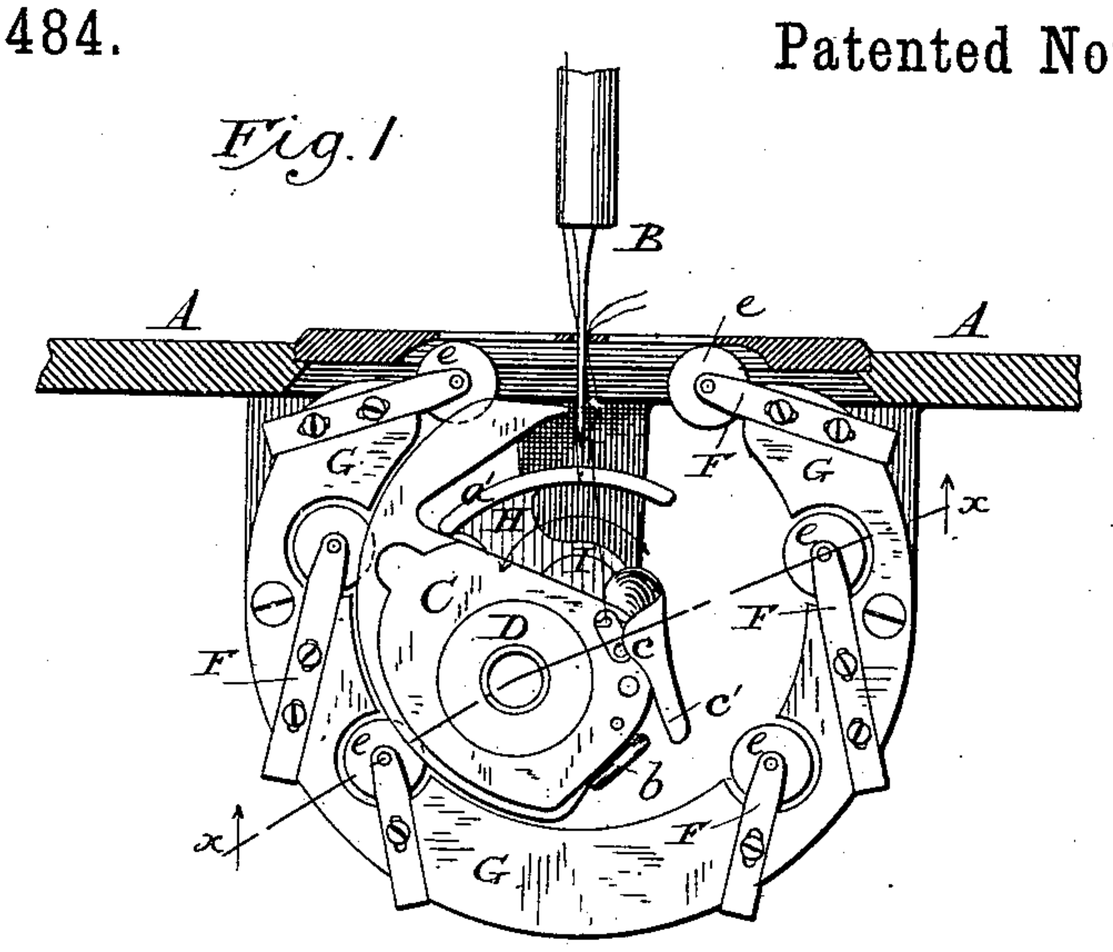

Fig. 2.

on line x–x

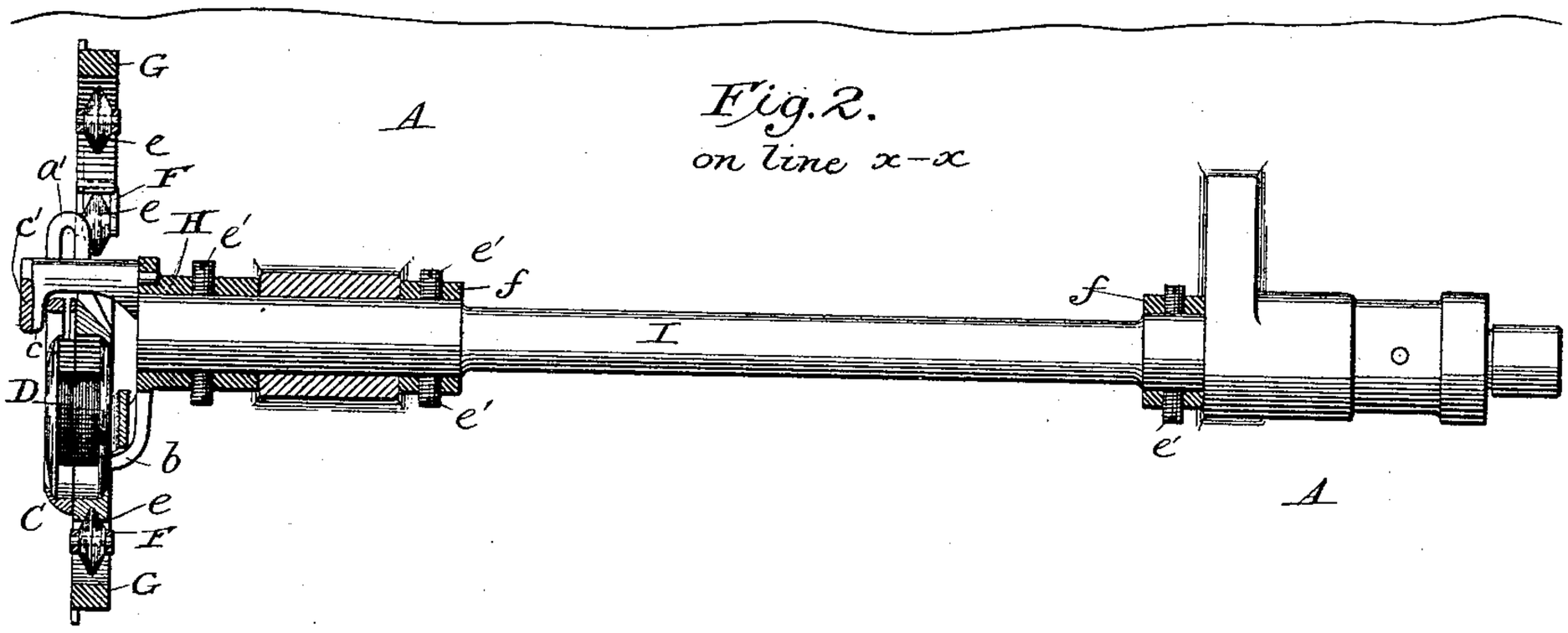

Fig. 3.

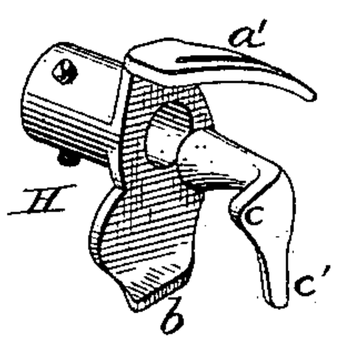

Fig. 4.

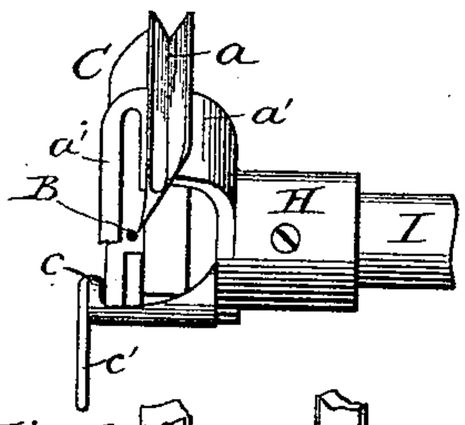

Fig. 5.

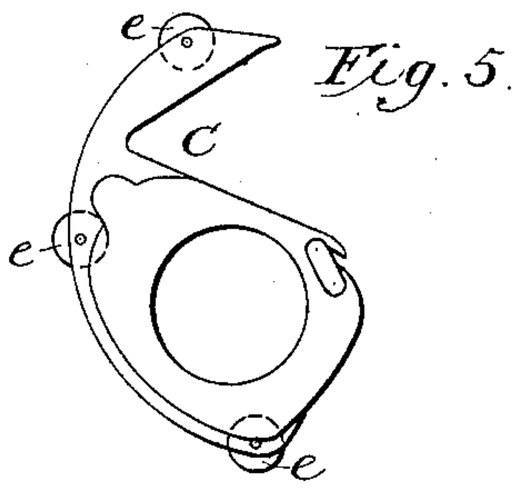

Fig. 6.

Fig. 7.

WITNESSES

Sidney P. Hollingsworth

W. H. Shipley

INVENTOR

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UNITED STATES PATENT OFFICE.

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

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 329,484, dated November 3, 1885.

Application filed May 29, 1885. Serial No. 167,059. (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 Sewing-Machines, of which the following is a specification.

This invention has reference to those machines in which the oscillating shuttle is used in connection with a reciprocating eye-pointed needle, and more particularly to machines of the type represented in Letters Patent of the United States granted to me on the 2d day of December, 1884, No. 308,697.

The principal aims of the invention are to reduce the wear and friction on the shuttle; to avoid the necessity of using lubricants, and thus, in connection with other matters, to avoid soiling or discoloring the thread and fabric; to provide for adjusting and guiding the point of the shuttle, that it may travel safely in close proximity to the needle; and, finally, to avoid the difficulties commonly experienced from the generation of electricity when the machine is driven at high speeds.

The invention relates to the guidance and maintenance of the shuttle by peripheral rollers or wheels, in place of the usual race or guide; to a fastening device for holding the shuttle in proper position with respect to the oscillating driver and the needle; to the use of shuttle-guiding rolls which are non-conductors of electricity and also of non-resonant material—such as rawhide—for the double purpose of preventing electrical disturbances and of lessening the noise, and to various matters of secondary importance, hereinafter fully explained and pointed out.

In the accompanying drawings I have represented only those portions of the machine which are necessary to a proper understanding of my present invention. The remaining parts may be of any ordinary construction.

Figure 1 represents a side elevation of the needle, shuttle mechanism, and attendant parts. Fig. 2 is a horizontal section upon the line *x x* of Fig. 1, looking in an upward direction. Fig. 3 is a perspective view of the shuttle-driver. Fig. 4 is a top plan view of the shuttle and the guiding-roller by which its point is caused to travel in the proper relation to the needle. Fig. 5 is a side elevation of the shuttle in modified form, the peripheral rollers being attached to the shuttle, instead of to the frame. Fig. 6 is a vertical section showing the manner in which the shuttle represented in the preceding figure was sustained and guided. Fig. 7 is a sectional elevation of the shuttle and guide in modified form, the grooves being formed in the roller, instead of in the shuttle.

Referring to the drawings, A represents the bed-plate or cloth-plate of the machine; B, the vertically-reciprocating needle, which descends through the bed, and C the oscillating shuttle, located beneath the bed adjacent to the path of the needle, and provided with a bobbin, D. In its general form and construction the shuttle is similar to that represented in the patent hereinbefore referred to; but instead of being constructed with a solid edge to travel in a stationary grooved race or guide, as usual, it is constructed with a peripheral groove, *a*, designed to receive the beveled edges of the series of guiding and supporting pulleys which are grouped around the path traversed by the periphery of the shuttle. The rollers are mounted in arms F, which are adjustably secured by screws to a stationary supporting-ring, G. The number and arrangement of the rollers are such that two or more of them are always in engagement with the shuttle, which is thus sustained and guided accurately as it oscillates in a circular path. It is to be particularly noted that the number and arrangement of the rolls are such that they serve as the sole means of guiding the periphery of the shuttle, which is thus permitted to operate without the use of the ordinary race or guide, and without sliding contact with any stationary part whatever. In practice it is found that when thus supported the shuttle may be driven with great ease, and that although subjected to the strain of thread under high tension it will run for a great length of time without appreciable wear in any direction, being guided accurately in its original path of movement. As the rollers bear on the two sides of the groove, and as these two sides will wear equally, it follows that the wear will not cause the shuttle to move laterally out of position. The converging walls of the groove, in connection with the rolls, which

may be adjusted to travel closely therein, serve to prevent the slightest side-play of the shuttle, and in this regard the rollers have an important advantage over the ordinary race, the wear of which results in "side shake" or play of the shuttle, so that its point may, on the one hand, encounter the needle, or, on the other hand, travel so far therefrom as to escape the thread. The essence of my invention in this regard consists in the use of a series of peripheral rolls to guide the shuttle.

While it is preferred to employ the stationary rolls having beveled edges to enter the groove in the shuttle, as before described, and as represented in Figs. 1, 2, and 4, it is to be understood that the rolls may be grooved and the edge of the shuttle beveled to fit therein, as represented in Fig. 7, or that the rollers may be attached to the periphery of the shuttle and arranged to travel in a grooved circular track, as in Figs. 5 and 6. For various reasons, unnecessary to detail, the arrangement first described causes the best results.

In order to impart motion to the shuttle, I make use of an oscillating driver, H, of the form represented in Fig. 3, or other suitable form, attached to one end of a rock-shaft, I. The shoulders *a'* and *b* of this driver act against the edge of the shuttle to turn it forward and backward, respectively, and to hold it outward, so as to retain its periphery in engagement with the guiding-rolls.

For the purpose of guiding the point of the shuttle accurately and closely as it passes the needle, I employ, in addition to the guide-rolls and driver, an adjustable lip or shoulder, *c*, secured or otherwise attached to the rear edge of the driver in position to engage over the inner edge or heel of the shuttle on the outer face, as plainly represented in Figs. 1 and 2. On reference to Fig. 1 it will be seen that the lip stands slightly forward of the vertical plane of the needle at the instant when the point of the shuttle advances past the needle. Being thus located, and engaging over the outer face of the shuttle, the lip holds the forward edge and the point of the shuttle inward for the moment in such manner that the point which moves past the inner side of the needle, as usual, is prevented from tipping outward and striking the same, and this without interfering with the play or freedom of the shuttle which is required in order that it may be carried through the loop of the needle-thread. At the instant when the needle-thread loop is opened to its widest extent for the passage of the shuttle and bobbin therethrough, the lip stands directly beneath the needle, so that the shuttle may rise under the strain of the thread and permit the free movement of the latter. This shoulder, thus arranged, prevents the rocking or tipping of the shuttle laterally within the carrier, and, in connection with the guide-roll at the top in advance of the needle, insures the movement of the point in the exact path required. The shoulder is provided with an extended arm, *c'*, by which it may be conveniently turned backward out of action, in order that the hinged side of the shuttle may be opened to permit the insertion or removal of the bobbin. The essence of the invention in this connection consists in having an adjustable lip or shoulder to engage over the shoulder of a shuttle, such as herein shown; and it is manifest that the form and arrangement of the lip may be somewhat modified without changing its mode of action.

I am aware that movable arms, springs, and other devices have been applied in various forms to hold shuttles from falling out of their carriers or drivers. The lip of my machine is not for this purpose, as my shuttle will remain in place and the machine be operative without the use of the lip, the function of which is merely to limit the lateral play of the shuttle at a proper time in its movement.

In operating machines of the present type properly when driving at high speeds and with threads under high tension, as in the sewing of leather and like materials, much difficulty and annoyance are experienced in consequence of the bed and frame-work becoming charged with electricity developed by the friction of the thread upon the shuttle. To avoid this difficulty, I propose to support the shuttle by guiding devices which are non-conductors of electricity. In the present instance the guiding-rolls *e* are constructed of rawhide, from pressed leather, or equivalent material which is a non-conductor of electricity, and moderately elastic, so as to be non-resonant, and thus reduce the noise or clatter.

I do not claim to be the first to guide a shuttle by non-conducting material, as I am aware that a reciprocating shuttle has been mounted in a race having a glass surface.

In practice it is found desirable to provide for the adjustment of the shuttle-carrier in the direction of its axis, to compensate for wear and permit the most favorable adjustment of the parts with reference to the needle. To this end I attach the shuttle-carrier to the shaft I by means of set-screws *e'*, and secure the shaft against end motion by means of collars *f*, seated against the side of its bearings, or by equivalent devices which will prevent end-play.

While I have described my improvements in connection with a machine in which the shuttle has an oscillatory motion, it is manifest that the anti-friction devices are applicable in the same manner, and with like results, to machines in which the shuttle receives a continuous rotary motion.

Having thus described my invention, what I claim is—

1. In a sewing-machine, the combination, substantially as described and shown, of a sustaining-frame, an oscillating shuttle, and a series of peripheral rolls acting as the sole guides for the shuttle.

2. In a sewing-machine, the combination of an oscillating shuttle, a series of rolls

grouped around the peripheral path of the shuttle, and engaging therewith, as described, for the double purpose of supporting and guiding the same and preventing lateral motion, and the oscillating shuttle-driver acting to hold the shuttle outward and maintain the engagement of the rolls.

3. In a sewing-machine, the combination of an oscillating shuttle having a peripheral V-shaped groove therein, a series of bevel-edged rolls grouped in a circular line about the shuttle, and affording constant support therefor, and the oscillating driver.

4. In a sewing-machine, the combination of a needle, an oscillating shuttle, and a fixed roll to engage the periphery of the shuttle and prevent side-play thereof, said roll located in advance of the needle on the side from which the shuttle-point advances, whereby said point is compelled to pass in close proximity to the needle, but prevented from striking the same.

5. In combination with the reciprocating needle, the oscillating shuttle-driver, the shuttle of the general form herein shown, the peripheral guides for the shuttle, and the movable lip attached to the driver and loosely engaging the inner or forward edge of the shuttle, substantially as described and shown, whereby the point of the shuttle is held out of contact with the needle while passing thereby.

6. In combination with a metallic shuttle, a series of peripheral guiding-rolls of rawhide or equivalent non-conducting non-resonant material, whereby electrical disturbances and noise are prevented.

7. In combination with the oscillating shuttle and the peripheral guiding-rolls therefor, the roll-sustaining arms adjustable independently in radial directions, affording compensation for wear, and permitting the position of the shuttle to be varied as required.

In testimony whereof I hereunto set my hand, this 8th day of May, 1885, in the presence of two attesting witnesses.

WM. A. POLMATEER.

Witnesses:

WILLIAM H. SHIPLEY,

P. T. DODGE.