

D. H. CAMPBELL.
Sewing Machine.

No. 241,613.

Patented May 17, 1881.

Fig. 1.

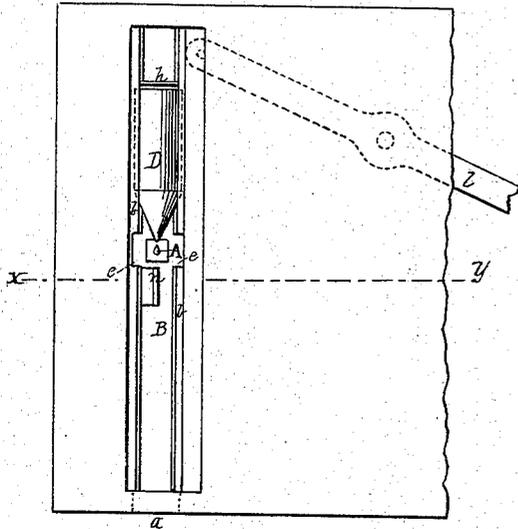


Fig. 2.

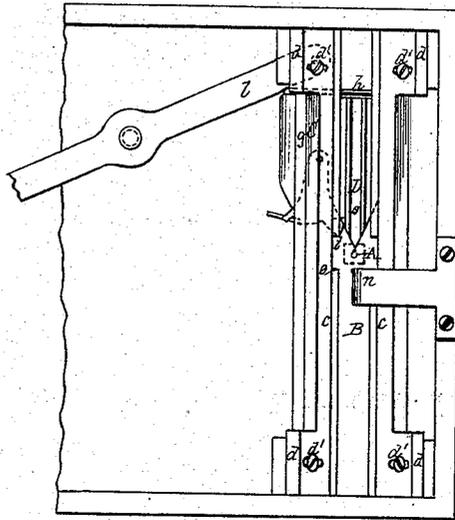


Fig. 3.

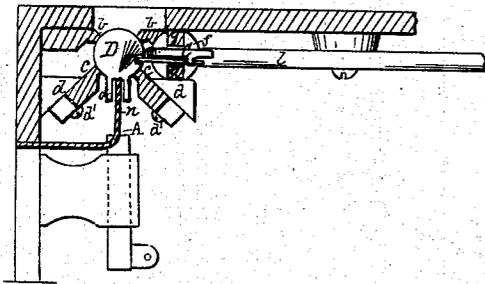


Fig. 4.

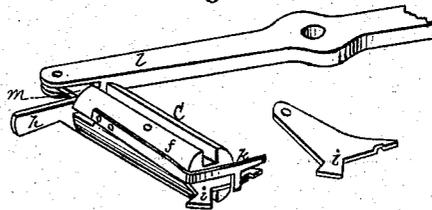


Fig. 5.

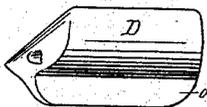


Fig. 6.

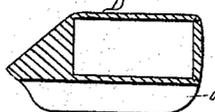


Fig. 7.

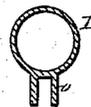
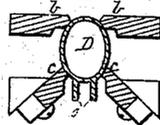


Fig. 8.



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UNITED STATES PATENT OFFICE.

DUNCAN H. CAMPBELL, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR OF
THREE-FOURTHS TO HENRY B. METCALF, FRANK E. COMEY, AND DANIEL
McNIVEN, ALL OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 241,613, dated May 17, 1881.

Application filed May 13, 1879.

To all whom it may concern:

Be it known that I, DUNCAN H. CAMPBELL, of Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description thereof.

Mysaid improvements are particularly adapted to wax-thread machines, in which a hook-needle is employed, and they relate to the shuttle, its race, and driver.

As heretofore, the point of the shuttle is centrally located, and when in the race said point occupies the plane in which the hook-needle moves, so that the thread-loop carried down by the needle is opened equally to the right hand and the left by the shuttle in its forward movement. Heretofore such shuttles have been mounted upon and supported by parallel ways or slides, which involved on the shuttle either a laterally-extended longitudinal web or a longitudinal groove at each side thereof. With the lateral webs on the shuttle the loop brought down by the needle must be opened as much wider than the lateral diameter of the body of the shuttle as is the aggregate width of the webs, and with the longitudinal grooves in the sides of the shuttle its body must necessarily be thick enough to admit of said grooves therein, and being correspondingly smaller internally, they to that extent reduce its thread-carrying capacity. By reason of my invention I am enabled to largely reduce its external lateral dimensions in order that it may pass through a loop with reduced friction therewith; and to that end I have combined with a centrally-pointed shuttle and a hook-needle a cage-race which engages with the body of the shuttle at four diagonally-opposite points.

A cage-race of the character named may be variously constructed; but the form preferred by me consists of four parallel bars or plates with inner edges fitted to afford true and even bearing-contact therewith of diagonally-opposite upper and lower portions of the shuttle.

In using the term "centrally-pointed" as applied to the shuttle, I do not mean that its point is exactly coincident with its axis, but that its point occupies a central position with reference to the shuttle-race, and that said point, the axis of the shuttle, and the path of the needle occupy the same vertical plane.

I have applied to the shuttle-race herein-after particularly described the term "cage-race" because it confines the shuttle strictly to a longitudinal movement by its contact with the shuttle at four separate and diagonally-opposite points, and it therefore circumferentially surrounds the body of the shuttle after the manner of an inclosing-cage, with but little actual contact therewith.

I am well aware that the United States Letters Patent of Howe and Bliss, June 30, 1857, exhibits a shuttle having a point centrally located with reference to the center of the race, and that said shuttle-point, the axis of the shuttle, and the path of the needle are practically in the same vertical plane. In that prior combination, however, an eye-pointed needle operating from above the shuttle is employed, and the point of the shuttle is located in line with the top of the shuttle, necessitating the employment of a vibrating stripper for so controlling the loop as to admit of the shuttle's passage through it; whereas the point of my shuttle is below its axis, a hook-needle is employed therewith, and it operates from below the shuttle for drawing down a loop, through which the shuttle readily forces its way. The race in said Howe and Bliss machine consists of a concave bed and two upper guides, the space between them being occupied by a longitudinal spline on the top of the shuttle, and therefore the shuttle is in contact with the concave bed and with the under sides and inner edges of the upper bars, instead of having a limited contact, as in my cage-race, at four diagonally-opposite points.

For accurately adjusting the cage-race to the shuttle, two of its bars are mounted on inclined planes and are adjustable radially with reference to the space occupied by the shuttle.

For properly controlling the shuttle in its

movements, I have combined with a centrally-pointed shuttle a cage-race and a shuttle-driver; and, still further, I have combined with said shuttle and cage-race a shuttle-driver mounted upon a slide and provided with a finger for engaging with the heel and a neck-finger for engaging with one side of the neck of the shuttle. The neck-finger is movable on the driver to facilitate the removal of the shuttle longitudinally out of the race.

I employ with the cage-race, as herein shown, a shuttle having a longitudinally-recessed web on its lower side, as heretofore used by me in wax-thread machines, such as are described in a certain prior application for Letters Patent filed by me January 30, 1878, and I have now combined a cage-race, a hook-needle, a centrally-pointed shuttle having a longitudinally-recessed web on its under side, and a stationary stop located below the path of the shuttle in line with its point and in front of the path of the needle. This stop occupies the longitudinal recess in the shuttle at the time of its passage through the loop for obviating friction between shuttle and loop due to the tendency of the shuttle to carry the loop forward after it has been cast off from the needle by the shuttle-web, and I have also combined with the four parallel bars constituting a cage-race, having lateral recesses adjacent to the path of the needle, a stationary stop centrally located between and below the lower bars, whereby the loop is prevented from moving forward with the shuttle, one end of each recess of each bar co-operating with the stop in affording five separate abutting-surfaces for the loop to engage with.

I am well aware that the loop may be well controlled solely by the ends of the recesses in the four bars of the cage-race, especially in heavy low-speed machines.

The several features believed to be novel are made the subjects of claims hereunto annexed.

To more particularly describe my improvements I will refer to the accompanying drawings, in which I have shown so much of a sewing-machine as is necessary for a proper illustration of my invention.

Figure 1 represents, in plan view, the front portion of the bed of a machine, with the head and race plates removed. Fig. 2 represents the same viewed from below. Fig. 3 represents the same in vertical section on line *x y*, Fig. 1. Fig. 4 represents the shuttle-driver detached. Figs. 5, 6, and 7 represent, respectively, the shuttle in side view, central longitudinal section, and in lateral section. Fig. 8 represents, in lateral vertical section, a cage-race with an oval-bodied shuttle therein.

The hook-needle A is moved in a vertical path in a manner well known, rising from below and carrying down its loop.

The cage-race B for the shuttle extends from one side of the frame to the other, and it has an opening at *a* in the side of the machine for the insertion and withdrawal of a shuttle. It is composed of two parallel upper bars or plates,

b, on opposite sides of the race, and two similar lower bars or plates, *c*. The inner edges of these plates may be flat, plain-surfaced, or slightly concaved, according to the exterior sectional contour of the shuttle to be used therewith, so as to afford four diagonally-opposite points of contact. The lower plates or bars wholly support the shuttle, and the upper plates serve as guides, and also resist such tendency of the shuttle to rise from the lower plates, as is particularly incident to working with waxed thread. The upper plates are permanently attached to the frame of the machine. The lower plates are set angularly, so that in cross-section they are radial to the central line of the race, and are mounted upon the inclined planes *d* by means of set-screws *d'*, which occupy slots in the plates and admit of their radial adjustment for accurately locating the shuttle in the cage and compensating for such wear as is liable to occur at their edges in contact with the shuttle. Each plate adjacent to the path of the needle is recessed for affording abutting-surfaces *e*, for maintaining the loop in a vertical position during the passage of the shuttle.

The shuttle-carrier C embraces a double-grooved slide, *f*, fitted between parallel guides *g* at the rear of the cage-race, and has a fixed finger, *h*, which projects into the cage-race for engaging with the heel of a shuttle, and a movable finger, *i*, for engaging with one side of the neck of the shuttle. This neck-finger is pivoted to the slide, so that it may be swung rearward from the shuttle, and it is provided with a latch, *k*, which secures it in position when in service. The shuttle-driver is operated through the lever *l* in a manner well known—as, for instance, in the well-known “Domestic” machine—it being connected to the slide *f* by a link, *m*.

The loop-stop *n* is shown and described in my prior application for Letters Patent. It is a bent piece of thin metal secured to the frame of the machine, and occupies edgewise a position below the race and parallel with it and in front of the path of the needle.

The shuttle D has no side grooves or webs, as heretofore essentially employed for mounting it in its race, but it has the same recessed longitudinal web, *o*, on its lower side, which I have heretofore employed on a centrally-pointed shuttle, as shown in my application for patent before referred to. For enabling the neck-finger *i* of the shuttle-driver to properly engage with the shuttle during its backward movement, the shuttle has a slight recess on one side of its neck. When the shuttle is in its race the stationary loop-stop *n* occupies the recess in the web *o* during its forward and backward movement.

It is to be understood that as the hook-needle draws down a loop the shuttle moves forward, and as soon as it is fairly entered into the loop the needle rises slightly into the recess of the web, which casts off the loop from the hook, and that the stop *n* being immediately in front of the needle adjacent thereto, and within the web-recess, the lower end of the

loop is prevented from moving forward with the shuttle, as is fully set forth in my prior application for Letters Patent hereinbefore referred to.

It will be seen that the four bars or plates constituting the cage-race afford a perfect control of the shuttle against all undue rotary, lateral, and vertical movement, in the case of a shuttle having a body which is oval in cross-section or one slightly flattened at four diagonally-opposite points, and that when the web is employed on a shuttle having a truly cylindrical body the two lower plates, by contact with the sides of the web, limit the shuttle to a strictly longitudinal movement.

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

1. The combination, with a centrally-pointed shuttle, of a hook-needle having its path at right angles to the axis of the shuttle and in the same plane therewith, and the cage-race for the shuttle composed of parallel bars, which engage in guiding contact with the shuttle at diagonally-opposite points, substantially as described.

2. A shuttle-race composed of four parallel bars inclosing with their inner edges a space for the reception of a shuttle, two of said bars being mounted on inclined planes and adjustable with reference to each other and to the other bars of the race, substantially as described.

3. The combination, with a hook-needle, the cage-race, and the centrally-pointed shuttle adapted to co-operate with said needle, and

with its axis in the plane of the path of the needle, of the shuttle-driver mounted on its own slide and provided with a finger for engaging with the heel of the shuttle, and a movable finger for engaging with one side of the neck of the shuttle, for permitting the shuttle to be moved forward away from the driver and out of the race, substantially as described.

4. A shuttle-driver provided with a movable finger for engaging with one side of the neck of a shuttle, in combination with a latch for releasing said finger from its engagement with the shuttle, substantially as described.

5. The combination, with a hook-needle and the cage-race, of a centrally-pointed shuttle having a longitudinally-recessed web on its lower side and a stationary stop in front of the path of the needle below the path of the body of the shuttle and in line with its point, substantially as described.

6. The shuttle-race composed of four parallel bars or plates provided with recesses adjacent to the path of the needle, and affording abutting-surfaces for the loop, in combination with a stationary stop below the lower bars, substantially as described, whereby five abutting-surfaces are afforded for maintaining the loop in a vertical position during the passage of the shuttle, as set forth.

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Witnesses:

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