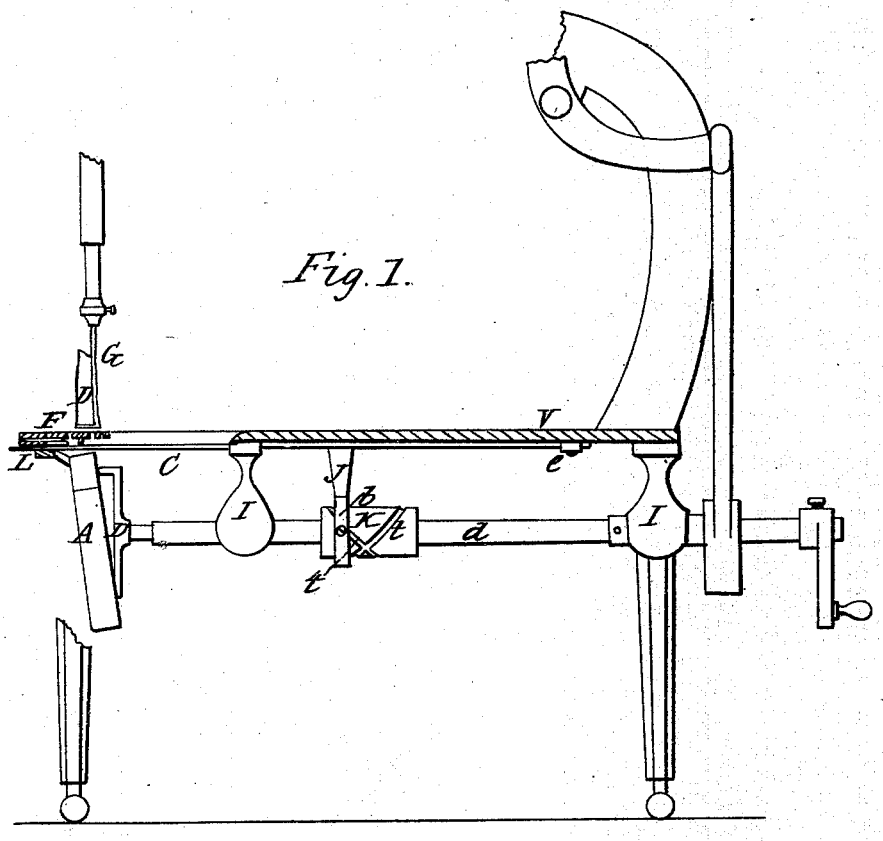
ALLEN & LAMB.

Sewing Machine.

No. 49,421. Patented Aug. 15, 1865.

Fig. 1.



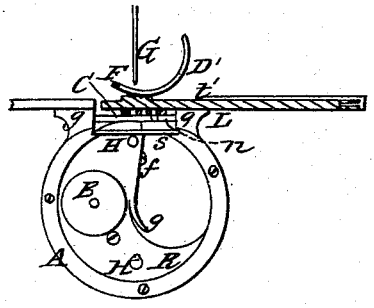


Fig. 3.

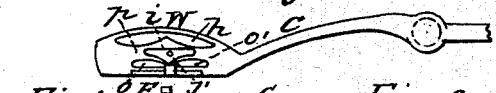


Fig. 4.

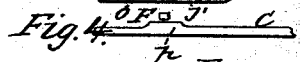


Fig. 6.

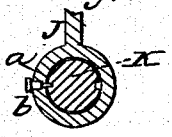
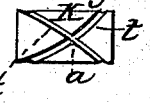


Fig. 5



Witnesses:

M. Thearwood

C. L. Topliff

Inventors:

J. Allen

T. Lamb

By them to

Atty.

UNITED STATES PATENT OFFICE.

THOMAS LAMB AND JOHN ALLEN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **49,421**, dated August 15, 1865.

To all whom it may concern:

Be it known that we, THOMAS LAMB and JOHN ALLEN, of the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Sewing-Machines; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of so much of a sewing-machine as is necessary to explain and illustrate our invention. Fig. 2 is an elevation of the inner face of the shuttle race or ring. Fig. 3 is a detailed view of the slide which operates the feeding-dog. Fig. 4 is a side view of the slide. Fig. 5 is a side view, and Fig. 6 is a cross-section, of the cam which operates the slide.

Similar letters of reference indicate like parts.

This invention in sewing-machines consists of several particulars, among which is the peculiar construction and operation of a sliding piece, which produces not only the necessary reciprocations of the feeding-dog, but also controls and guides the needle-thread in making an interlocked stitch with the shuttle-thread, first on one side and next on the other side of the revolving shuttle.

V designates the table of a sewing-machine, supported upon legs, and having the usual standard for supporting those parts of the machine which operate above the table. These parts and legs are partly broken away in Fig. 1.

The shaft which gives motion to the operative parts is designated by the letter *d*, and is supported beneath the table by hanging bearings I, in which it is free to rotate. The shaft is driven by a crank or any other suitable means. The inner end of the shaft carries a driver, D, fixed centrally upon the shaft and at right angles thereto. The driver has fingers at each end, which project in directions parallel with the shaft, and which engage the shuttle at certain times in alternation with each other, as hereinafter set forth.

The shuttle R revolves within a circular race, A, set at an acute angle with the vertical plane of the driver D. The place of the race is below the table V. Its highest part is cut away, as shown in Fig. 2, and the ends formed by the removal of this part are attached to the forward end of the table beneath by brackets *q q*, fixed to the table by screws, which also sustain a plate, L, extending from one bracket to the other, which plate sustains the slide C in its reciprocations.

S is a bar or wire, which extends from one end to the other of the race or ring, being attached on the inner face of the race within the path of the shuttle. The office of this bar is to prevent the loop, while being drawn up, from being cast on the driver, and to sustain it and prevent it from displacement and keep it in the path of the nose or hook of the shuttle.

The shuttle R is seen in Fig. 2 in face view. It carries a revolving bobbin, B, whose thread passes through an eye, *f*, made in a projection on the inner vertical edge of the shuttle, and thence, through an eye formed at or near the axis of the shuttle, to the seam of the material which is being sewed.

The loop-detainer *g* is a flat hook formed on the inner straight side of the shuttle. It extends from the axis, or from a point near to the axis, of the shuttle a little way toward the point of its hook or nose in a curve nearly concentric with the curve of the hook. The hook or nose of the shuttle is formed, as seen in Fig. 2, by extending one of its ends in a curved line whose convexity coincides with the periphery of the rest of the shuttle.

H H are holes made through the shuttle at equal distances from its axis, which holes are alternately brought on the fingers of the driver D by the aforesaid inclination of the shuttle.

The slide C extends beneath the table, and its inner end passes through a guide, *e*. An arm, J, extends downward from the slide at about the middle of its length, and carries a ring which embraces and slides to and fro upon a hub, K, by means of a caster-pin, *a*, which moves in angular grooves *t t* cut around the hub in such directions that they cross each other on one side of the hub. If the grooves are extended upon a plane, they will form a double curve, like that of the figure 8.

The shank of the caster-pin fits in a socket formed in the ring of the arm J, and the pin is held to its place in the grooves by means of a

set-screw, *b*, whose end comes against the shank of the pin and keeps it down. The revolution of the hub causes the caster to traverse the grooves, and thereby to carry the arm J first to one end of the hub and then to the other end, and consequently to give a like reciprocating motion to the slide C, each one of these motions of the slide being produced by an entire revolution of the grooved hub. The slide C is so formed as to operate the feeding-dog and also assist in forming the successive stitches of the seam. That part of it which performs these offices is seen in plan view in Fig. 3 and in side view in Fig. 4. In the latter figure is also seen a cross-section of the feeding-dog F.

The feeding-dog consists of a bar which has an elevated serrated surface near that end which is beneath the pressure-foot D′, and a finger, *n*, projecting downward from its under side and entering into the slot *h* of the slide C. The outer end, *t*′, of the dog is supported in a slot in the table V, in which it is free to move in the direction of its length. The inner end of the dog rests upon the slide C, which it crosses at right angles. That part of the said slide which moves beneath the feeding-dog has an elevation, *p*, whose office is to raise the dog against the under side of the material to be sewed.

A slot, *h*, made in the slide in the direction of its length receives the finger *n* of the dog. A projection, *i*, extends from the inner side of the slot nearly across it, the inclined sides of the projection being embraced between straight lines, which would include the elevation *p* of said slide.

The outer boundary, W, of the slot *h* is curved at each end, so as to act on the finger *n* after the projection *i* has passed it and after the needle has been withdrawn. The action of this part of the slide C—that is, the part which actuates the feeding-dog—is as follows: When the slide is moved forward its elevated part *p* raises the dog and causes it to clamp the cloth between its serrated surface and the pressure-foot D′. The onward movement of the slide next brings the swell of the projection *i* against the finger *n*, and the dog is thereby moved forward a distance equal to the width of the projection *i* in order to effect the feed of the cloth. The needle descends into the cloth immediately after the apex of the projection *i* has passed the finger *n*. While the needle is in the cloth the feeding-dog is lowered, because the elevation *p* of the slide has passed beyond it, and it is at this instant, while the cloth is held by the needle, that the feeding-dog is pushed backward to its first position by the curved edge in the right-hand end of the slot *h*. When the slide begins its movement toward the right the needle is raised out of the cloth and remains out of it until the continued advance of the slide elevates and moves the feeding-dog forward, as before, for another stitch. When the projecting point *i* has passed the finger *n* the needle again descends into the cloth, the curved outer edge in the left of the slot returning the feeding-dog to its former position.

The operative portion of the slide C is made broad, so as to contain not only the slot *h*, but also three other slots, O O′ O². The slots O O′ are continuations of each other, and a projection, 2, extending a little way into the intermediate space, serves to mark the separation of the slots from each other. The slot O² lies between these slots and the slot *h*. It is separated from the slots O O′ by curved fingers *j j*′, which extend toward but do not touch each other, their ends being curved slightly toward the projection 2, so as almost to close the inner ends of the slots O O′. It results from this construction that the three slots O O′ O² have communication with each other at the terminations of the fingers *j j*′. The path of the needle is through the slots O O′, into each of which it descends alternately.

The office of the fingers is to guide the needle-thread so that its loops may be drawn up on the shuttle-thread without obstruction, and also to push the shuttle-thread first in one direction and then in the opposite direction, in order to bring it alternately on opposite sides of the shuttle.

One of our objects in setting the shuttle-race in an inclined position is to enable us to drive it by means of a shuttle-driver whose arms revolve continually in the same vertical path, that finger of the driver which is opposite the highest part of the shuttle being always free therefrom because of such inclination, thus allowing the driver to pass the loops without molesting them. The amount of space between these parts of the shuttle and the driver is determined by the angle of such inclination. When the needle descends and carries its loop into the slot O′ the nose of the shuttle enters the said loop and the needle is withdrawn before the slide has moved the slot O′ past it. The needle-thread is then left extended from the eye of the needle, or from the seam made in the material being sewed, through said slot down to the shuttle. The movement of the slide toward the right causes the said thread to slip out of said slot into the slot O², whose left-hand end bears it inward until it reaches a vertical line to the right of the shuttle. The needle now descends through the slot O′, when the shuttle enters another loop on the left side of the first loop. The needle being again drawn up, the slide moves toward the right and the threads of the new loop are received into the slot O² and pushed by the right-hand end of that slot toward the left, the shuttle meanwhile drawing up the first loop into the cloth. Thus the loops are brought to opposite sides of the shuttle alternately, while the movements of the needle and shuttle are always in the same path. When the loops are drawn up into the cloth by the shuttle the interlocked shuttle-thread is carried up with it. Therefore the shuttle-thread, which extends from the seam to

the eye at the center or axis of the shuttle, is pushed alternately to the right or left of the path of the shuttle along with the needle-thread. The effect of this operation on the shuttle-thread is to take out of it the twist which is put upon it at each revolution of the shuttle. The twisting of the shuttle-thread by the action of the rotary hook on the rotating shuttle is one of the disadvantages attending that class of sewing-machines. Our object is to take the twist out of the thread at the formation of every loop.

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

1. Alternating the threads which form the seam from one side to the other of the shuttle, so as to remove the twist from the shuttle-thread, substantially as above described.

2. The finger-guides *j j* and the slots O O′ O² formed in the slide C, substantially as and for the purpose above described.

3. Operating the feeding-dog by means of the slide C through the action of the slot *h*, with its curved outer side and its projecting side *i*, and through the action of the elevation *p*, the said devices being placed on the slide C, and acting against the under side of the dog and against its finger *n*, substantially as above described.

4. The combination of the sliding ring of the arm J, the caster-pin *a*, and the grooves *t t*, for the purpose of producing the reciprocation of the slide C, substantially as above described.

5. The loop-detaining hook *g*, placed on the inside edge of the shuttle, substantially as herein shown.

THOMAS LAMB.
JOHN ALLEN.

Witnesses:
M. K. STUART,
BENJAMIN CLEE.