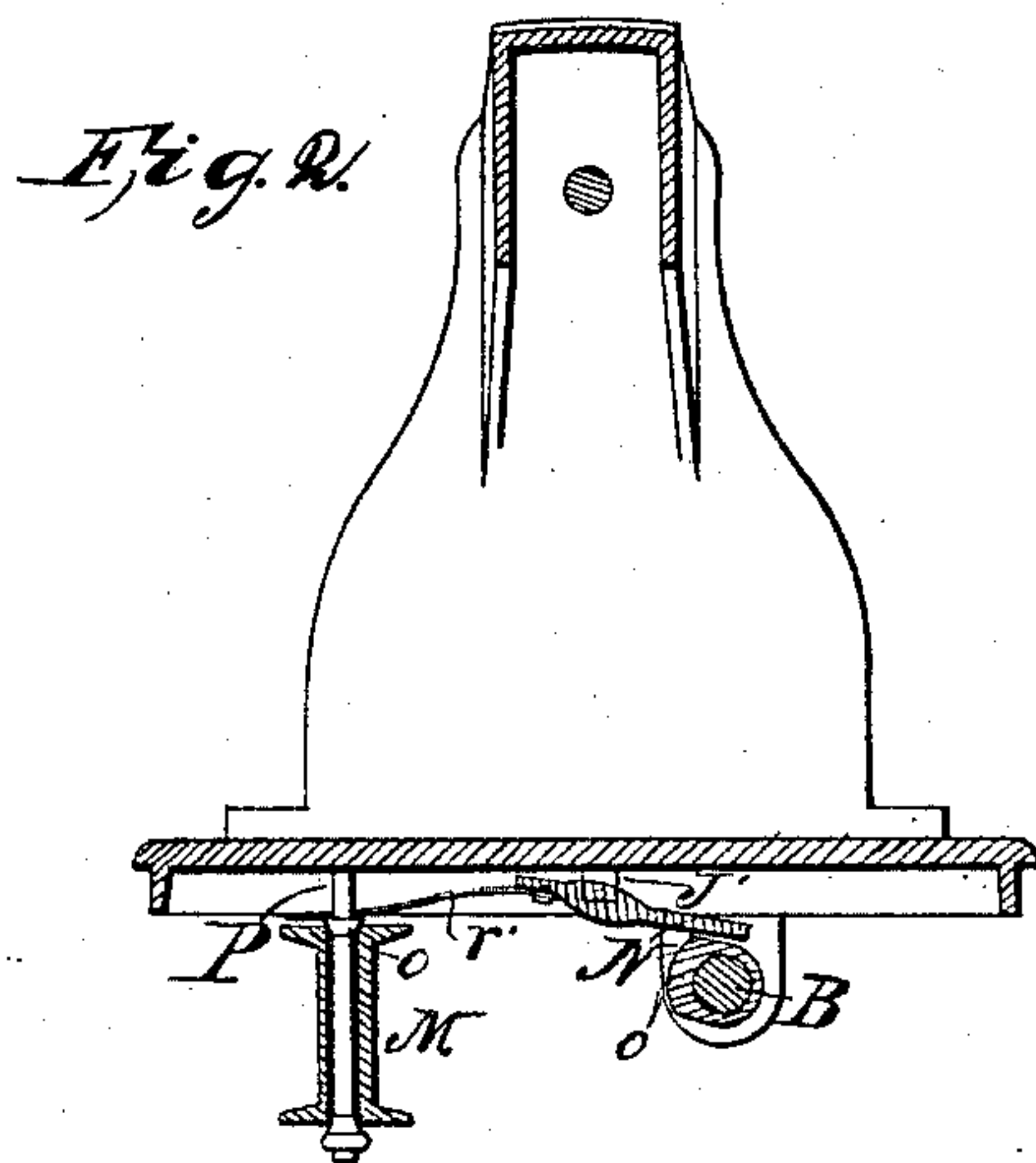
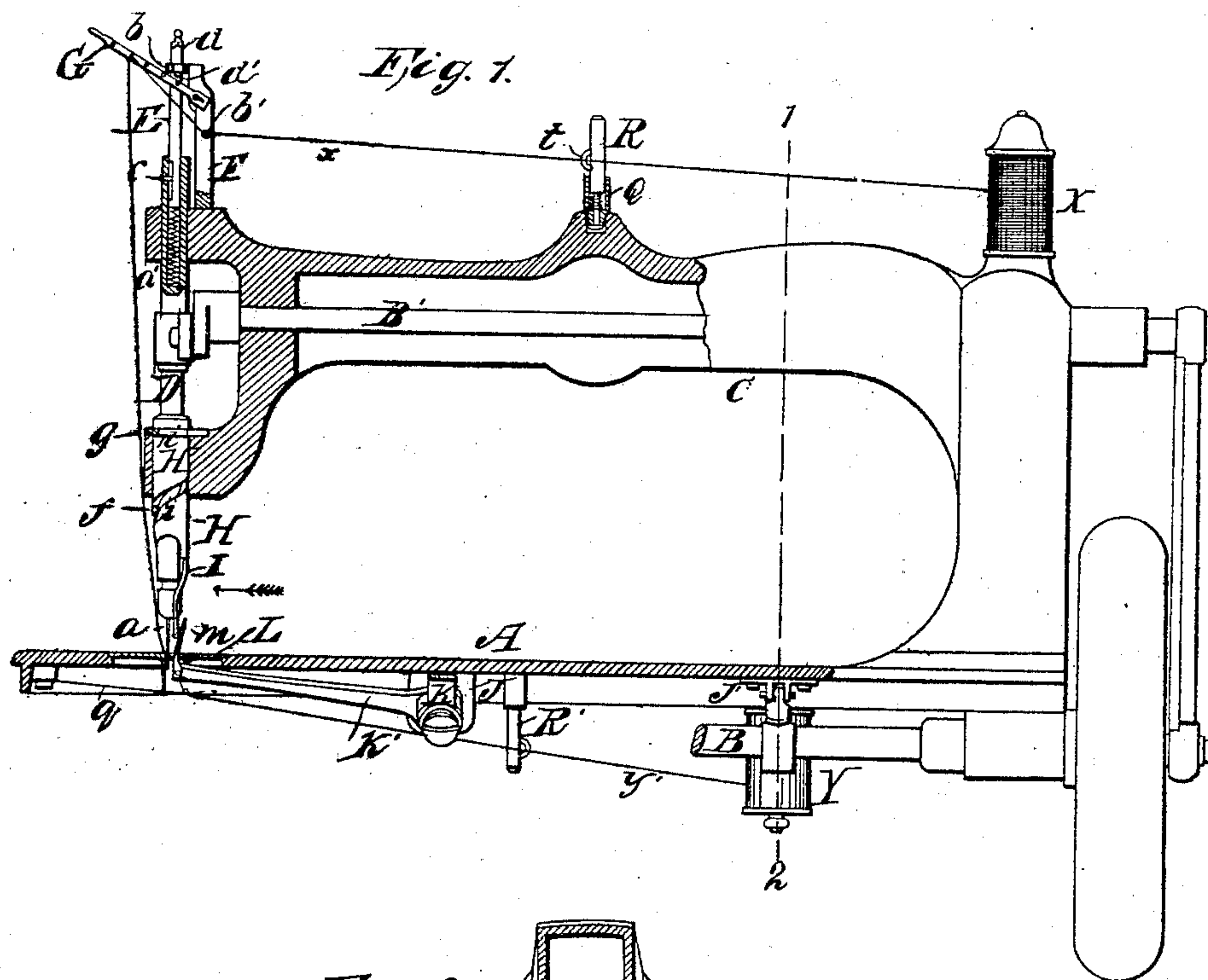


G. REHFUSS.  
SEWING MACHINE.

2 Sheets—Sheet 1.

No. 47,905.

Patented May 23, 1865.



Witnesses:

Charles Oyster  
W. R. Delany

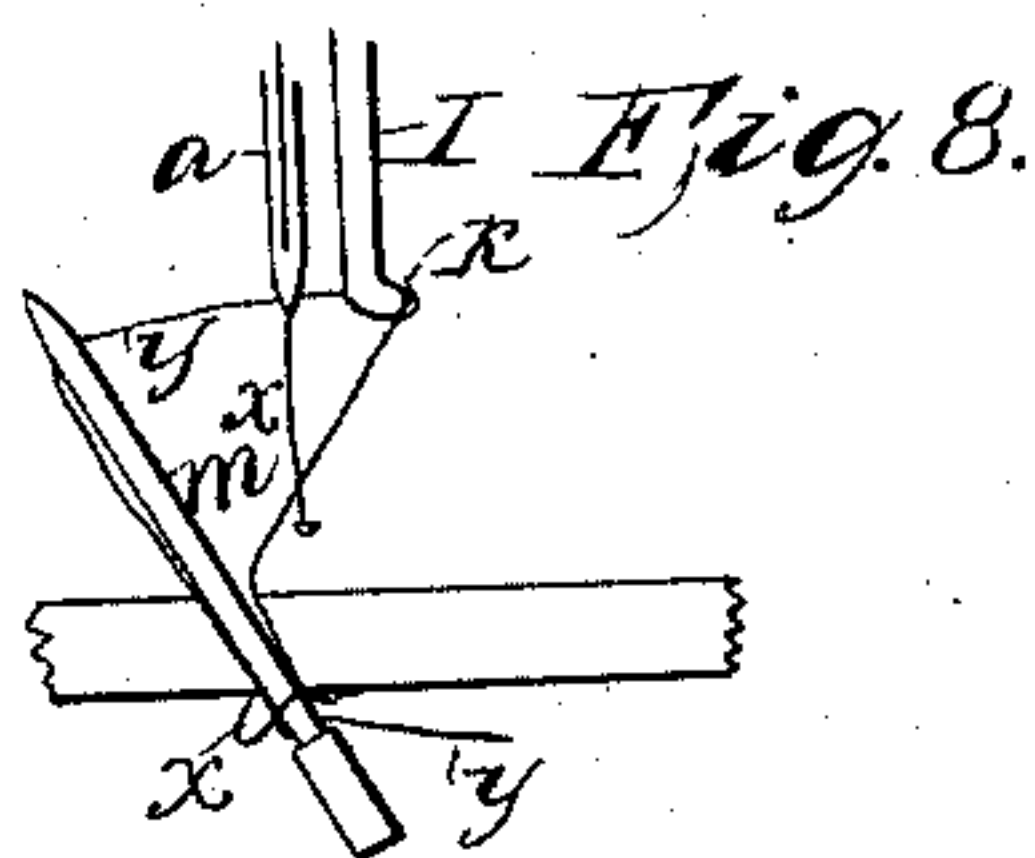
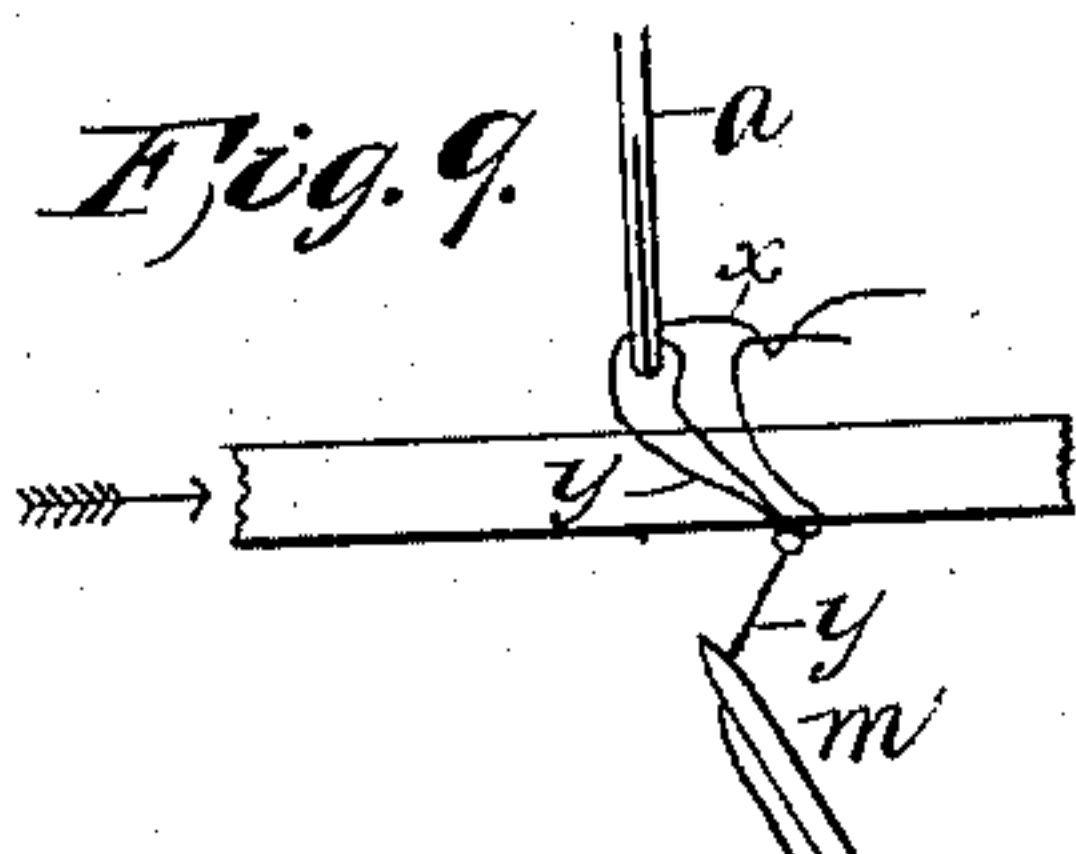
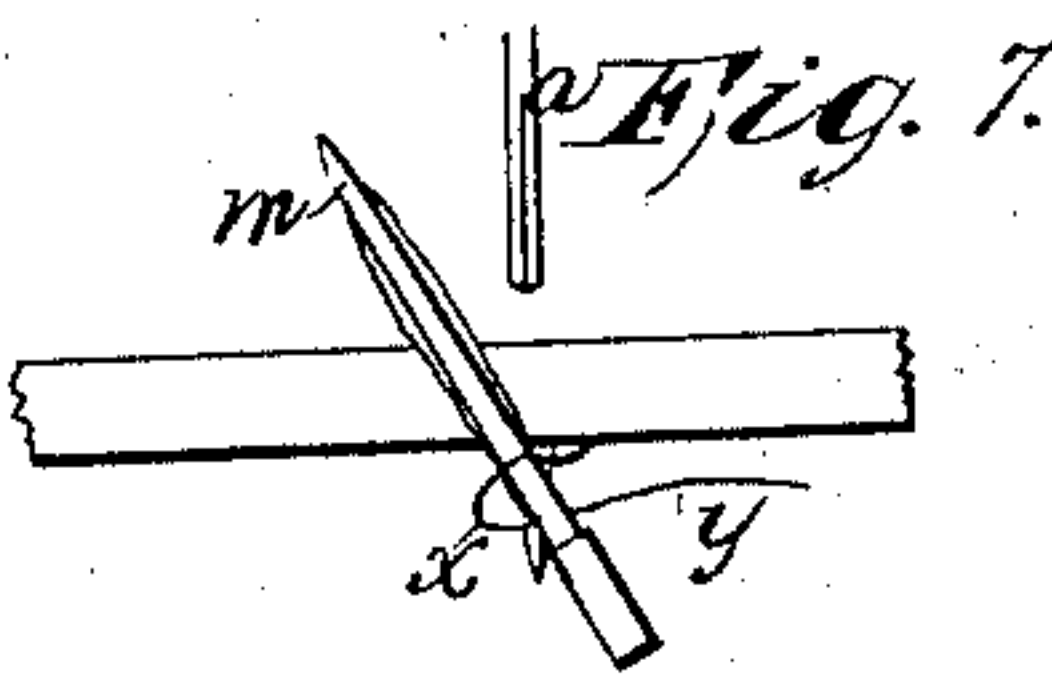
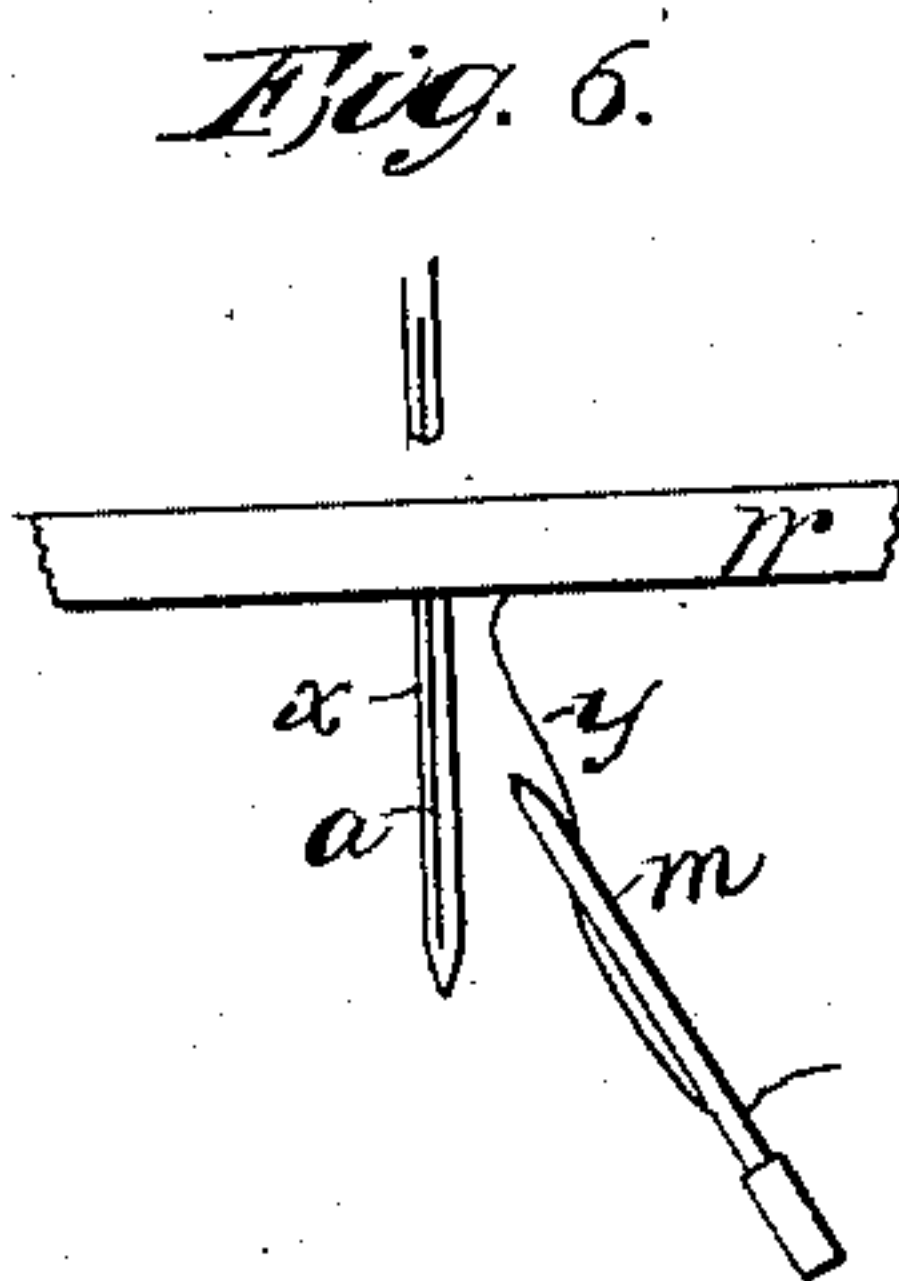
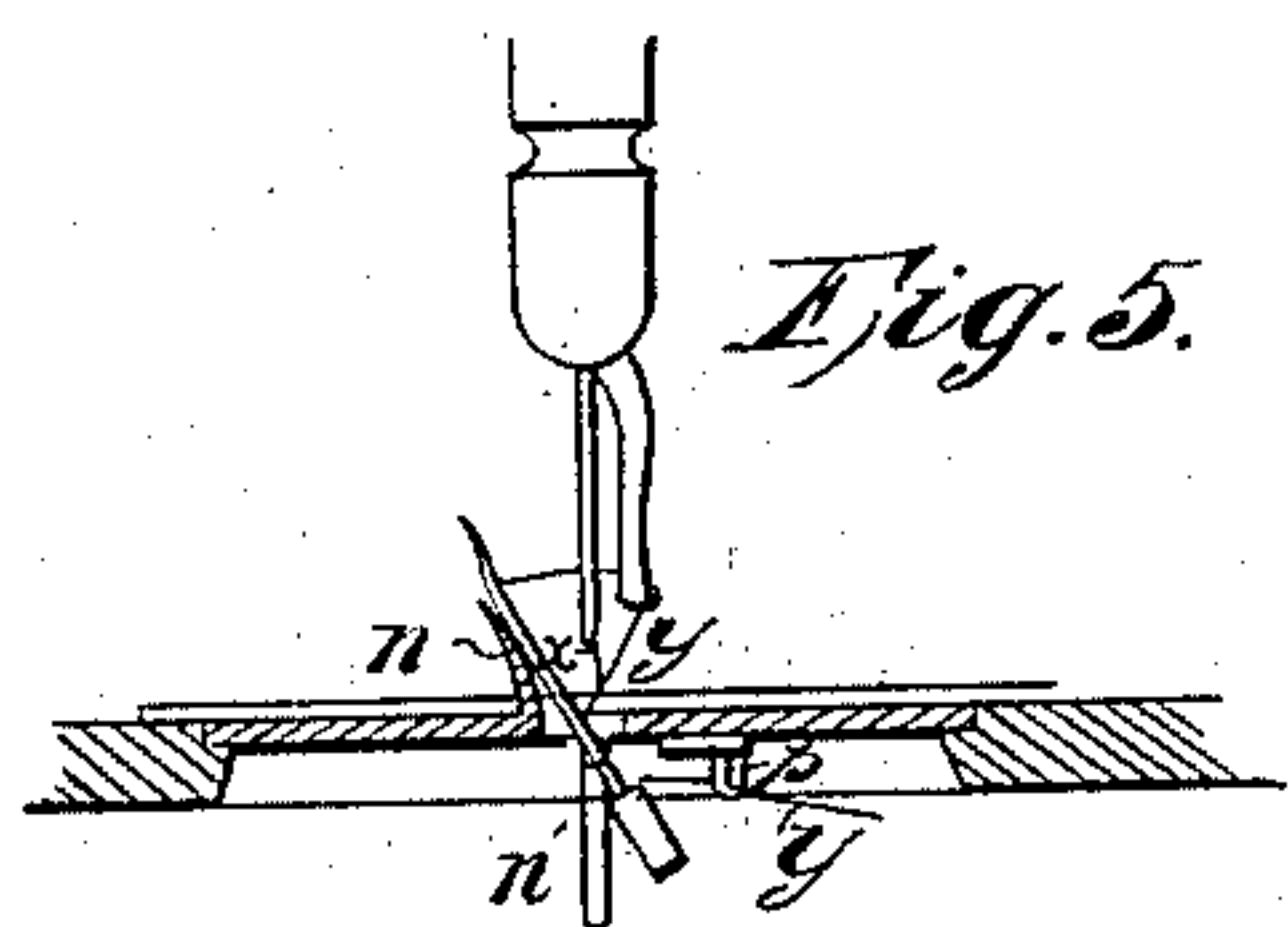
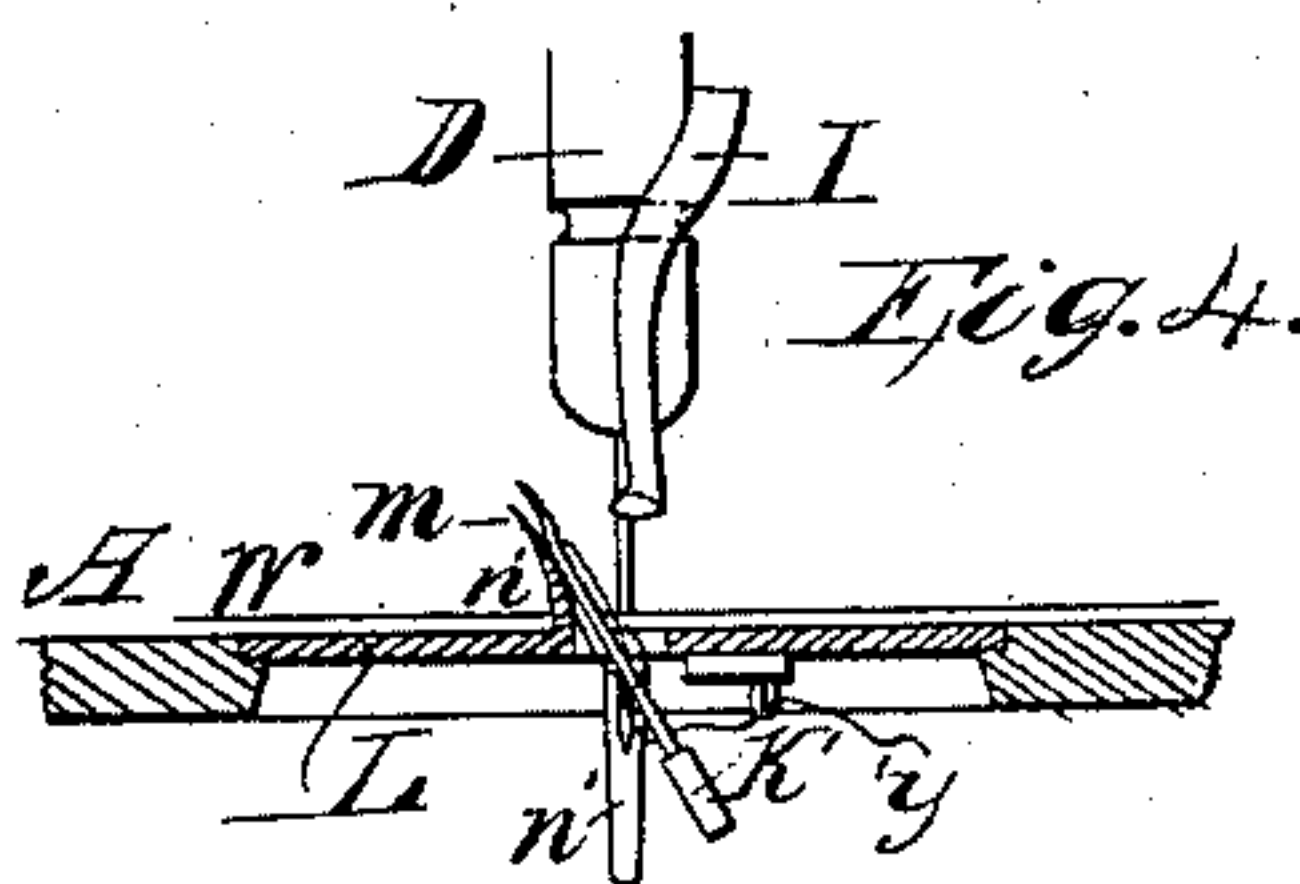
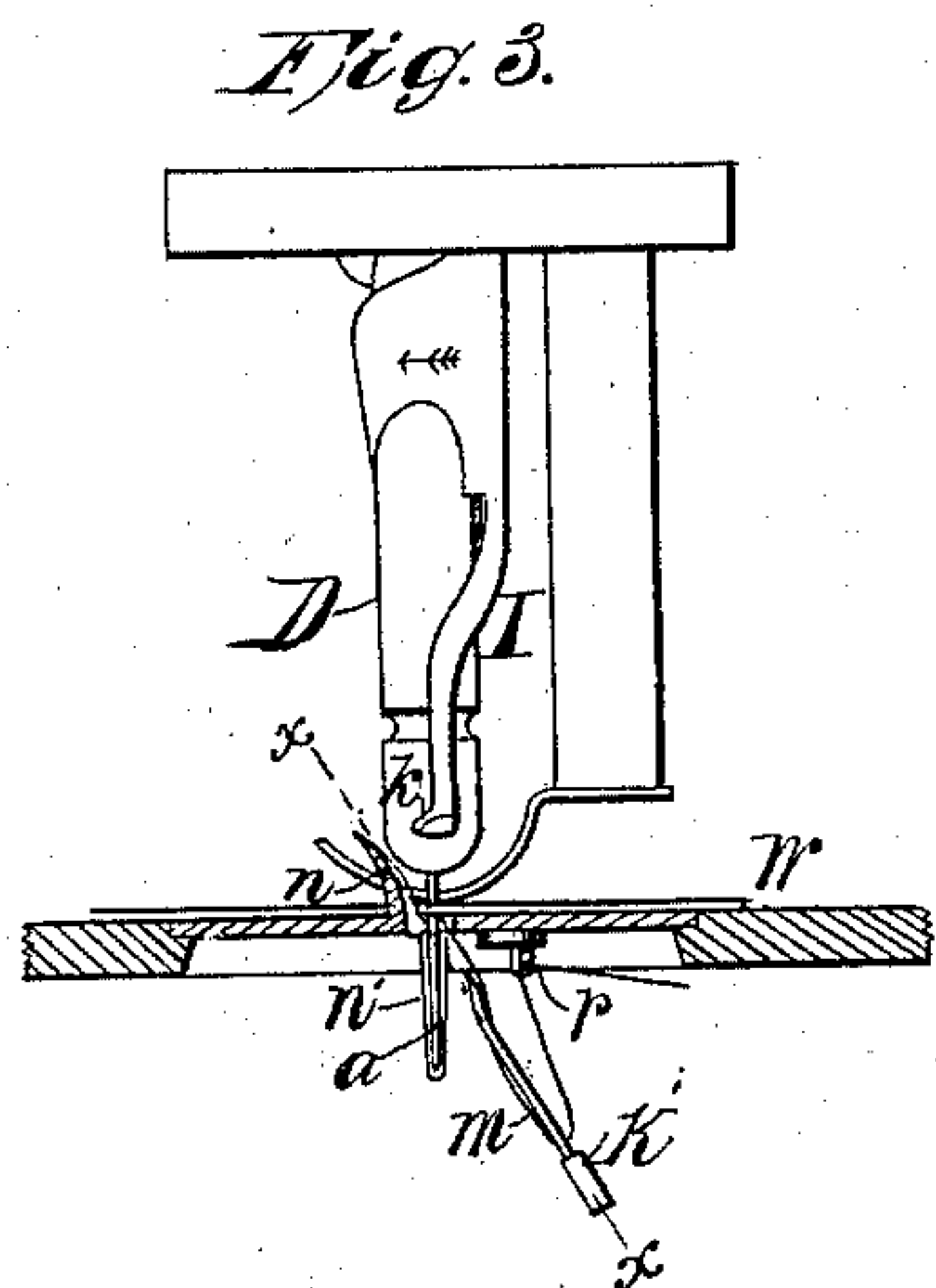
Inventor:

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G. REHFUSS.  
SEWING MACHINE.

No. 47,905.

Patented May 23, 1865.



Witnesses  
Charles E. Foster  
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Inventor:  
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# UNITED STATES PATENT OFFICE.

GEORGE REHFUSS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE AMERICAN BUTTON HOLE SEWING MACHINE COMPANY, OF SAME PLACE.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 47,905, dated May 23, 1865.

*To all whom it may concern:*

Be it known that I, GEORGE REHFUSS, of Philadelphia, Pennsylvania, have invented certain Improvements in Machines for Sewing Button-Holes; 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, and to the letters of reference marked thereon:

My invention consists of certain mechanism, fully described hereinafter, for forming stitches on the edges of fabrics—such, for instance, as the edges of button-holes.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1, Drawing No. 1, is a side view, partly in section, of my improved button-hole sewing-machine; Fig. 2, a section on the line 1 2, Fig. 1; Figs. 3, 4, and 5, Drawing No. 2, views drawn to an enlarged scale, looking in the direction of the arrow, Fig. 1; and Figs. 6, 7, 8, and 9, diagrams showing the progressive formation of the stitch.

Similar letters refer to similar parts throughout the several views.

A is the bed-plate of the machine, beneath which turns the driving-shaft B.

C is the usual stationary arm, in which the shaft B' is caused to rock, this shaft imparting a reciprocating vertical motion to the needle-bar D, to the lower end of which is secured the needle *a*, the latter being supplied with thread *x* from the spool X.

In an opening in the upper end of the needle-bar slides a rod, E, below which is a spiral spring, *a'*, the upper end of the rod passing through a projection, *b*, on a standard, F, secured to the arm C. A pin, *c*, projects from the needle-bar into a slot in the rod E, so that the latter may slide freely in the bar, but cannot be withdrawn therefrom. In the rod E, above and below the bracket *b*, are openings adapted for the reception of pins *d* *d'*, which determine the extent of the vertical movement of the rod.

To a pin projecting from the side of the rod E is hung a lever, G, in the end of the short arm of which is a slot, and through the latter passes a screw into the side of the standard F.

In the long arm of the lever are a number of openings, *e*, and from the side of the standard F projects a pin, *b'*, in which is an eye, for a purpose described hereinafter.

To the lower portion of the needle-bar is adapted a sleeve, H, in which is a spiral opening, *i*, a pin, *f*, projecting from the needle-bar into this opening and imparting to the sleeve a vibrating motion as the needle-bar moves up and down, the sleeve being prevented from moving vertically by a plate, *g*, which fits into an annular groove, *i*, in the upper end of the sleeve, and which is secured to the stationary arm.

From the lower end of the sleeve projects an arm, I, at the lower end of which is a notched projection, *k*, for a purpose described hereinafter.

On the under side of the base-plate A is a bracket, J, to which is hung one end of a lever, one arm, K, of which bears against the side of a cam on the driving-shaft B, the other arm, K', projecting forward to a point beneath the work-plate L, its outer end being furnished with a needle or loop-carrier, *m*, which holds a loop of thread, *g*, the supply of the latter being obtained from the spool Y. The bracket J is set at such an angle to the bed-plate that the loop-carrier *m* shall move in a path coinciding with the line *x' x'*, Fig. 3, and shall pass through an opening in the plate L, on the upper face of which, at one side of the said opening, is a curved guard, *n*, and from the lower side of the plate, near the opening through which the needle *a* descends, projects a straight guard, *n'*.

On the lower side of the plate L is a staple, *p*, and near one edge of the bed-plate is a spring-tension, *q*, Fig. 1.

To a bracket, J', on the under side of the bed-plate A, is hung a lever, N, Fig. 2, the long arm of which projects over a cam, O, on the driving-shaft B. To the other arm of the lever is attached a spring-plate, *r'*, through a slot in the outer end of which passes a rod, P, and on the latter turns the spool M, the said spring-plate *r'* resting on a collar, *o*, which turns freely on the rod above the spool. A tension device, R, is attached to the arm C, and a similar tension device, R', to the under side of the base-plate A. The thread from the spool X is passed through the staple *t*, through the eye in the pin *h'*, through one or more of



the openings in the lever G, and thence to the eye of the needle *a*. The thread from the under spool, Y, passes through the staple of the tension device R', through an eye at the end of the spring-tension *q*, through the staple *p*, and thence through the eyes of the loop-carrier *m*, as best shown in Figs. 1 and 3. The fabric W being placed upon the work-plate so that the needle *a* shall penetrate the same a short distance from its edge, and the several parts of the machine being brought to the positions shown in Fig. 3, their operation will be as follows: As the needle *a* begins to rise a loop of thread, *x*, is formed at the side of the same, and this loop is penetrated by the loop-carrier *m*, which carries with it the thread *y* to the position shown in Figs. 4 and 7. As the needle *a* continues its upward motion the arm I moves round the needle-bar in the direction of its arrow, Fig. 1, the notched projection *k* at the end of the arm I catching the loop of thread *y* at the side of the loop-carrier *m*, and carrying it to the position shown in Figs. 5 and 8, so that a loop of the said thread shall be spread beneath the point of the needle *a*, which, as it descends, penetrates the loop and enters the fabric after the latter has been moved by the feed the length of one stitch in the direction of the arrow, Fig. 9. When the needle again rises a loop of thread, *x*, is formed at the side of the same, and this loop is penetrated by the carrier *m*, as before, the thread *y* being thus carried back and forth over the edge of the fabric and locked to the upper and under side of the same by the thread *x*, so as to form a binding over the edge of the fabric, such as is required for button-holes.

During the above-described operation it is important that both of the threads *x* and *y* should at certain periods be slack, and at other times be retained perfectly tight.

The length of the rod E and the manner in which the lever G is secured to the said rod and to the standard F are such that when the needle *a* is at the limit of its downward motion, and as it begins to rise, the lever G will occupy a horizontal position, so that the thread *x* may be slack enough to form a loop at the side of the needle. When, however, the loop-carrier has penetrated the loop of thread *x*, and the needle *a* begins to ascend, the lever G is quickly carried to the position shown in Fig. 1, so as to take up all the slack thread and draw the loop close to the fabric. The cam O is so arranged on the shaft B that as the loop-carrier *m* ascends through the loop of thread *x* the only tension on the thread *y* shall be that imparted by the tension devices R' and *q*. When, however, the carrier begins to descend, after the loop of thread *y* has been penetrated

by the needle *a*, the cam O raises the long arm of the lever N, so that the spring-plate *n'* shall bear firmly on the collar *o* and prevent the further revolution of the spool M. The thread *y* is therefore drawn tightly between the staple *p* and the fabric by the loop-carrier *m* as it descends.

It will be seen that such a perfect regulation of the tension of both threads as is necessary to insure a superior quality of work is obtained by the above-described devices.

In order to protect the needle *a*, as well as to insure the projection of the loop on the side of the needle, where it can be penetrated by the carrier *m*, the guard *n'* is arranged on the side of the needle opposite the said carrier, the guard being sufficiently close to the needle to prevent the thread from looping to any extent between the two.

On the upper side of the plate L the guard *n* is so arranged that it not only protects the needle *m*, but prevents the edge of the button-hole opposite to that which is being worked from crowding over the opening through which the loop-carrier rises and entangling the threads or otherwise interfering with the operation of the machine. The said guard also acts as a guide in turning the fabric when the rounded end of the button-hole is being worked.

It will be apparent that other means than those herein described and illustrated may be employed for imparting the desired motion to the arm I. I however prefer that described as being simple, cheap, and efficacious.

I claim as my invention and desire to secure by Letters Patent—

1. The arm I, with its notched projection *k*, or its equivalent, when arranged to vibrate round the needle to operate on the thread held by the loop-carrier *m*, substantially as described.
2. The sleeve H, with its spiral opening *i* and arm I, in combination with the needle-bar D and pin *f*, the whole being arranged and operating substantially as and for the purpose specified.
3. The guard *n*, arranged on the plate L in respect to the looper *m*, substantially as set forth, for the purposes described.
4. The rod E and lever G, in combination with the needle-bar D and its spiral spring *a'*, the whole being arranged and operating substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEO. REHFUSS.

Witnesses:

CHARLES E. FOSTER,  
JOHN WHITE.