(No Model.) 5 Sheets—Sheet 1.

# J. S. FREESE.

## BUTTON HOLE SEWING MACHINE.

No. 382,466. Patented May 8, 1888.

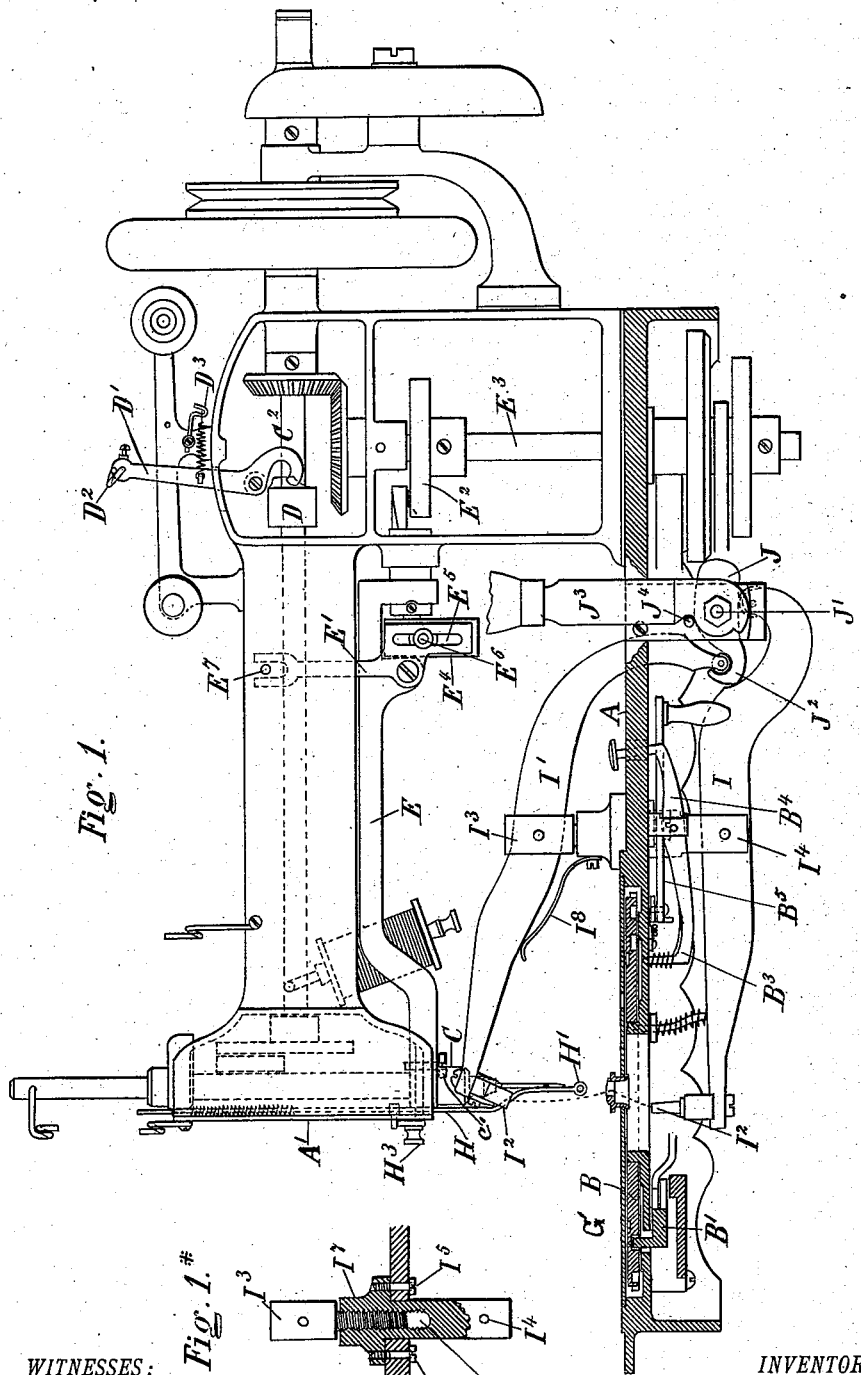

Fig. 1.

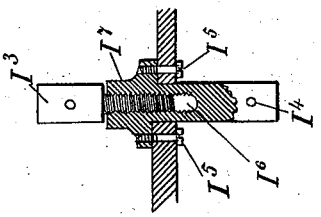

Fig. 1*.

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# J. S. FREESE.

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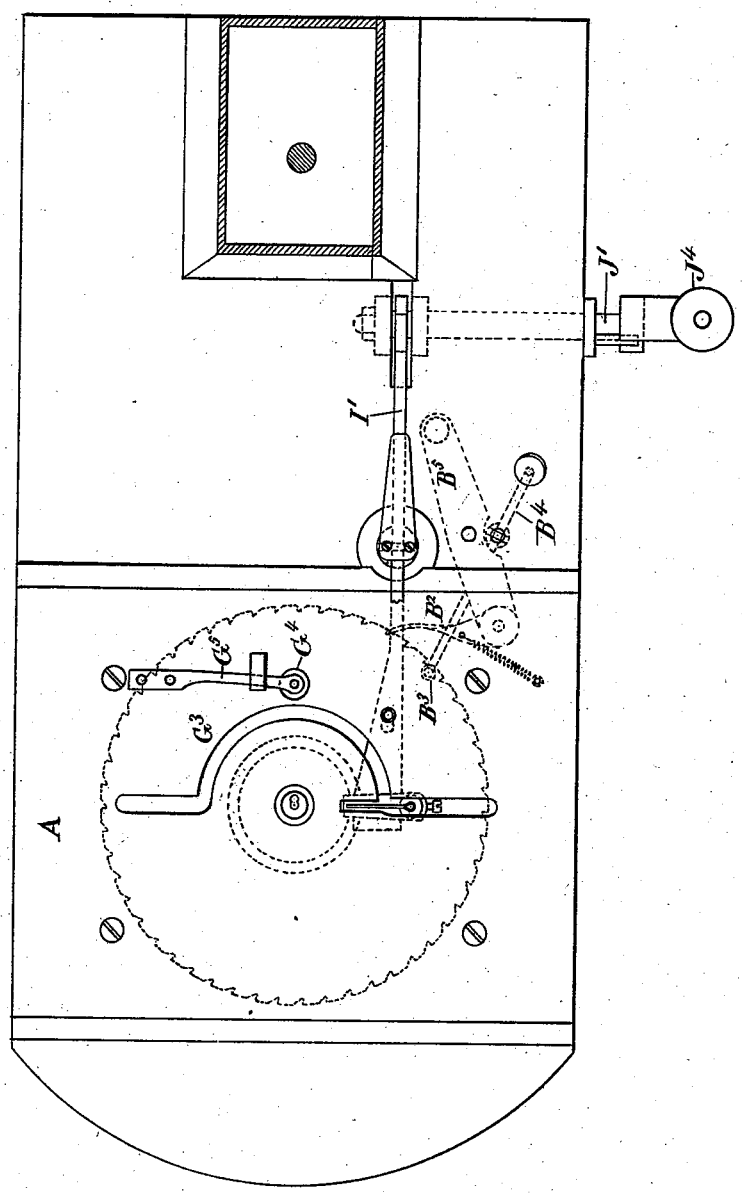


Fig. 2.

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# J. S. FREESE.

## BUTTON HOLE SEWING MACHINE.

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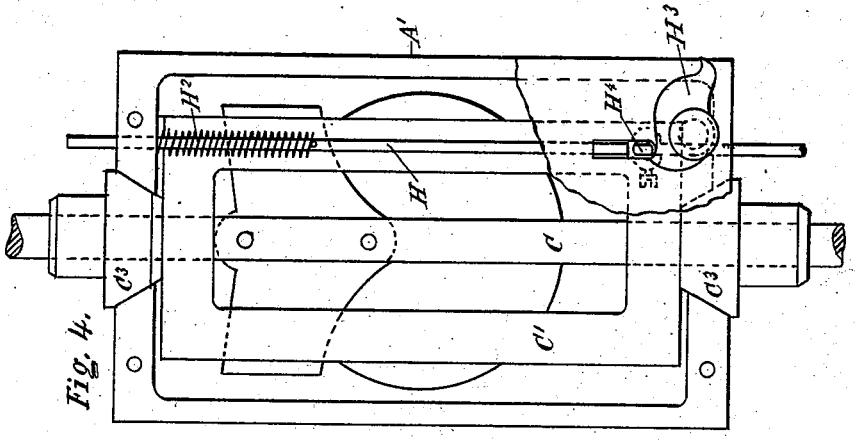


Fig. 4.

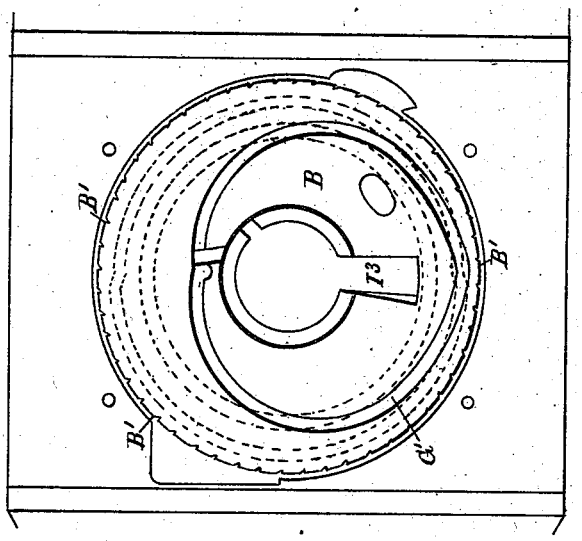


Fig. 3.

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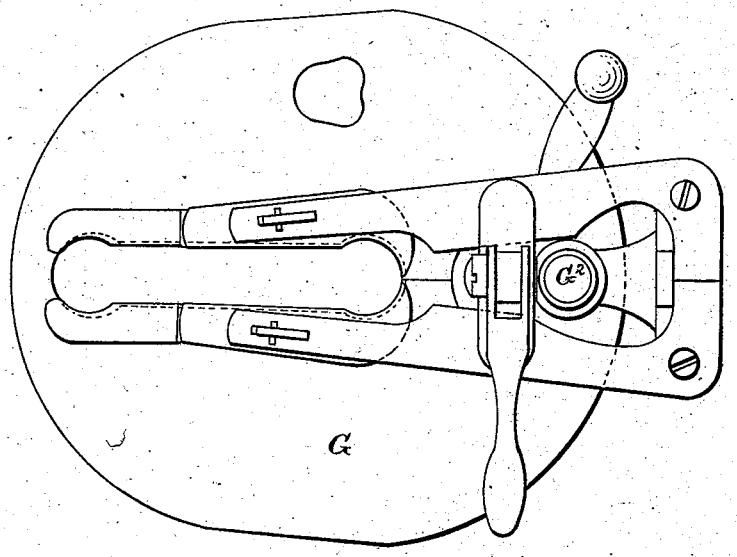
## BUTTON HOLE SEWING MACHINE.

No. 382,466. Patented May 8, 1888.

*Fig. 5.*

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(No Model.) 5 Sheets—Sheet 5.

# J. S. FREESE.

## BUTTON HOLE SEWING MACHINE.

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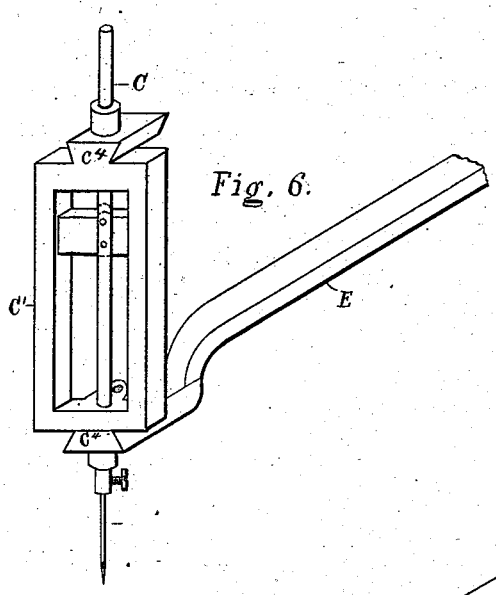
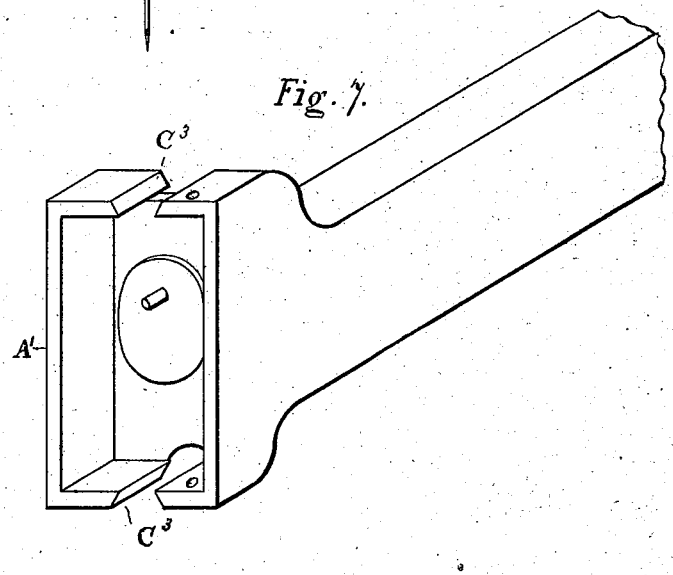



Fig. 6.

Fig. 7.




WITNESSES:

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John S. Freese.

BY

Francis C. Bowen

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# UNITED STATES PATENT OFFICE.

JOHN S. FREESE, OF BROOKLYN, NEW YORK.

## BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 382,466, dated May 8, 1888.

Application filed October 30, 1886. Serial No. 217,574. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN S. FREESE, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in a Button-Hole Sewing-Machines, of which the following is a specification.

My invention relates to improvements in the take-up, the operating mechanism of the needle-bar carrier, and of the cloth-plate operating mechanism; also, to a means for introducing an overseaming-thread into the button-hole when desirable, and to a button-hole cutting attachment, as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 represents a partial side view and partial longitudinal section of a sewing-machine combining my improvements. Fig. 1* is a vertical section of a detached portion thereof. Fig. 2 is a plan view thereof, partly in section. Fig. 3 is a plan view of the feed-wheel and adjacent parts. Fig. 4 is an end view of the machine-arm, partly in section. Fig. 5 is a plan view of the cloth-plate. Figs. 6 and 7 are detail perspective views of the machine-head and needle-bar carrier and means for reciprocating the same.

Similar letters of reference indicate similar parts.

The letter A designates the bed-plate of the machine, having the feed-wheel B arranged therein and operated by means of a dog, B′, in the usual manner. C designates the needle-bar arranged in a carrier, C′, and connected with the operating-shaft $C^2$, to receive the proper vertically-reciprocating motion therefrom.

On the needle-bar-operating shaft $C^2$, near the rear end thereof, is mounted a revolving cam, D, the face of which is arranged to act on one end of the take-up lever D′, pivoted in the rear portion of the arm, and the other end of which is provided with thread-guides $D^2$, and which constitutes a take-up, the operation thereof being to draw back the thread that may be passed through the guide $D^2$ at the proper intervals under the impulse of the cam D, and thereby tighten the loop formed in the thread at the sewing-point. A spring, $D^3$, is connected to the take-up lever D′, to retain the same in engagement with the cam, said spring being a spiral spring, with one end connected to the lever and the other end connected to a fixed point on the arm. The cam D is so shaped as to leave the take-up lever D′ stationary during a certain period, causing said lever to act in a similar manner to the nippers commonly used for holding the loop in the thread at the sewing-point.

To the needle-bar carrier C′ is connected, by means of a screw, *c*′, (shown in Fig. 1,) and opening for screw, (shown in Fig. 6,) one end of a rod, E, which serves to impart thereto the required horizontal reciprocating motion, the carrier being guided in guideways $C^3$, of V shape, at the top and bottom of the head of the machine-arm, the carrier being provided with slides $C^4$ of corresponding shape to said ways. By the shape of said ways and slides any waste of either of the parts may be readily compensated for by simply adjusting the slides in relation to the needle-bar carrier by means of the screw C′.

To the rod E a swinging arm, E′, is pivoted at or near its angular portion. The upper end of this swinging arm is forked and engages with a pin, $E^7$, which forms a fulcrum for the same. The lower end of said swinging arm extends horizontally a short distance from the upper portion, at a right angle therewith, and then extends downward, and is provided with a vertical slot, $E^5$. This vertically-slotted lower portion is connected with a vertically-slotted downward extension on one end of a horizontally-reciprocating extension-link, $E^4$, the other end of which engages with a cam-wheel, $E^2$, carried by a vertical shaft, $E^3$, which is geared with the shaft which operates the needle-bar. The connection of the slotted portion of the swinging arm E′ and the slotted extension $E^4$ is made by a screw-bolt, $E^6$, passing through said slots and provided with a nut. As the cam-wheel $E^2$ revolves, a longitudinally-reciprocating motion is imparted to the rod E through the medium of the reciprocating link $E^4$ and the swinging arm E′, having its fulcrum on the pin $E^7$. By adjusting the screw-bolt $E^6$ higher or lower in the vertical slots the longitudinal motion of the rod E is increased or diminished, so as to regulate the play of the needle.

The letter G designates the cloth-plate connected with a cam-groove, G′, (shown in Fig.

3,) in the top of the feed-wheel B by means of a pin or stud, $G^2$, which passes through a slot, $G^3$, of the bed-plate A. Said slot $G^3$ is partly straight and partly curved concentric with the feed-wheel, the straight portions being at the opposite ends of the curved portions thereof and in a plane intersecting the axis of the feed-wheel, as shown in Fig. 2.

In the operation of the machine the stud $G^2$ of the cloth-plate traverses the slot $G^3$ under the impulse of the cam groove G′ of the feed-wheel, and owing to said shape of the slot the cloth-plate is caused to turn around when one side of the button-hole has been sewed, then continue its motion in its reversed position until the button-hole has been completed, the portion of the cam-groove G′ required to produce said motion of the cloth-plate being about one-half of the entire length of the groove. The cloth-plate G is now to be returned to its first position, and to effect this purpose I provide the feed-wheel B with ratchet-teeth B′ on its periphery and arranged in engagement therewith a push-pawl, $B^2$, connected to a lever, $B^5$, to be operated by hand, said pawl having a suitable return-spring, so that the feed-wheel may be advanced by means of the pawl, for causing the return of the cloth-plate by the action of the other or remaining portion of the cam-groove G′. A stop pin, $B^3$, mounted on the end of a spring-impelled lever, $B^4$, and adapted to enter a socket of the feed-wheel, serves to determine the correct position of the cloth-plate, said lever also being capable of operation by hand. A friction-roller, $G^4$, mounted on the end of an arm, $G^5$, engages with one end of a cloth-plate in its reverse motion, and thereby serves to steady the plate.

In the head A of the machine-arm is arranged a vertical slide-rod, H, (see Figs. 1 and 4,) the lower end of which is provided with a thread-guide, H′, for introducing an overseaming thread in the button-hole that is being sewed, the length and position of said rod being suitable to that purpose. On the slide-rod H is arranged a spring, $H^2$, which acts thereon with a tendency to depress the same, and for the purpose of determining the position of the rod it is arranged to be acted on by swinging cam $H^3$, the face of said cam engaging with a spur, $H^4$, on the rod, and the cam being of such shape that when it is adjusted to one position the rod is allowed to take a lower and operative position, while when it is adjusted to another position the rod is lifted a sufficient distance to clear the cloth-plate, permitting its thread-guide H′ to be used or left out of use, as may be desirable.

Above and below the bed-plate are levers I I′, one carrying a block and the other carrying a cutter, $I^2$, of suitable form to cut a button-hole by their joint action in a well-known manner, one of said levers being provided with a return-spring, $I^8$. The operation of said cutter $I^2$ is produced by means of an oscillating cam, J, which is mounted on a shaft, J′, and constructed to engage the tail end of the upper lever, I′, by means of a hook, $J^2$, and to engage the corresponding end of the lower lever, I, by means of its face, so that when said cam is swung in the proper direction it acts on both levers simultaneously to cause the tail ends of the levers to recede from each other, the effect of which is to cause the cutters to oppose each other. The motion of the cam-shaft J′ is produced by means of a handle, $J^3$, mounted thereon, a stop-pin, $J^4$, serving to regulate such motion; and in order to permit the action of the cutters $I^2$ the feed-wheel B is provided with an opening, $I^3$, (see Fig. 3,) for the passage of the cutters, said opening taking the proper position when the cloth-plate is returned to the starting-point.

The cutting-levers I I′ have their fulcra in posts $I^3$ $I^4$, one of which is secured to the bed-plate A, as by means of screws $I^5$, (see Fig. 1*,) and is provided with a screw-threaded socket, $I^6$, to receive a corresponding threaded shank, $I^7$, of the other post. By this means the bed A is relieved of all strain arising from the operation of the cutter-levers, while said levers, moreover, may be readily adjusted in relation to each other when necessary.

The lever $B^4$ is for the purpose of arresting the feed-wheel B at certain desired points, the first point being to bring the wheel B to its normal starting-point, which, being on its starting-point to make the button-hole, the slot in the feed-wheel B is in position to allow the cutter to pass through the slot in the feed-wheel to cut the cloth. To form different sized button-holes said feed-wheel B is turned or ratched by hand instead of being worked by the machine, to bring it in proper position to the needle, and when the correct length of the button-hole is secured pins may be inserted to secure the machine in that position.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a button-hole sewing-machine, a bed-plate having the slot $G^3$ partly straight and partly curved, as shown, a feed-wheel having the cam-groove G′ and peripheral ratchet-teeth, a cloth-plate having a stud fitted in said slot of feed-plate to engage said groove of the feed-wheel, a spring-pawl engaging said teeth of the feed-wheel, a lever carrying said pawl, and a stop-lever adapted to engage with the feed-wheel, substantially as and for the purpose described.

2. In a button-hole sewing-machine, a cutting attachment composed of the levers I I′, having return-springs and forming a cutting device, an operating-cam, J, constructed to engage both of said levers simultaneously by bearing against the tail end of the lower lever with its face and pulling the tail end of the upper lever by means of the hook $J^2$, and a handle, $J^3$, mounted on the cam-shaft, substantially as and for the purpose described.

3. In a button-hole sewing-machine, a cutting attachment composed of levers I I′, one carrying a cutter and the other a block and meeting from opposite sides, an operating-

cam, J, constructed to engage both of said levers simultaneously by bearing against the tail end of the lower lever with its face and pulling the tail end of the upper lever by means of the hook $J^2$, and a handle, $J^3$, mounted on the cam-shaft, in combination with a feed-wheel having an opening for the passage of said cutters, substantially as herein described.

4. In a button-hole sewing-machine, the combination, with cutter-levers and means for operating the same, of posts $I^3$ $I^4$, forming the fulcra for said levers, one secured to the bed-plate and provided with a screw-threaded socket and the other having a screw-threaded shank fitted into said socket, substantially as and for the purpose described.

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Witnesses:
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JAS. S. EWBANK.