F. E. SCHMIDT & J. S. FREESE.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

No. 183,333. Patented Oct. 17, 1876.

Fig: 1

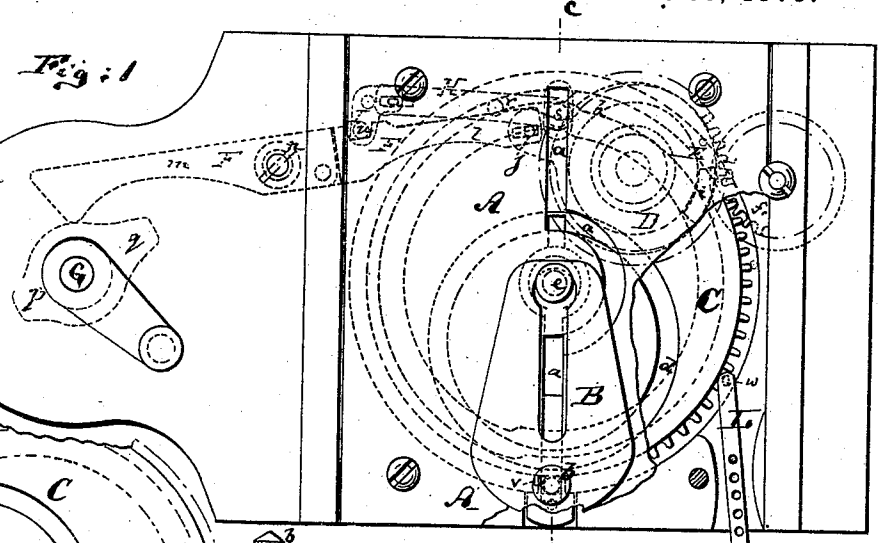


Fig: 5

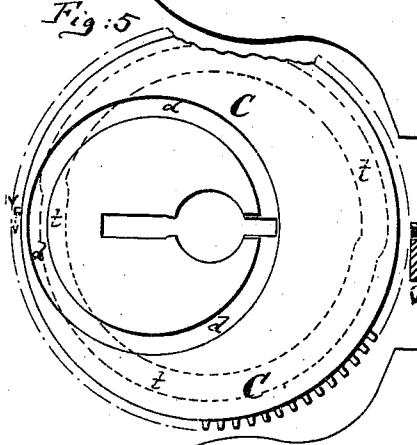


Fig: 3

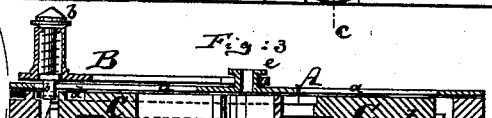


Fig: 2

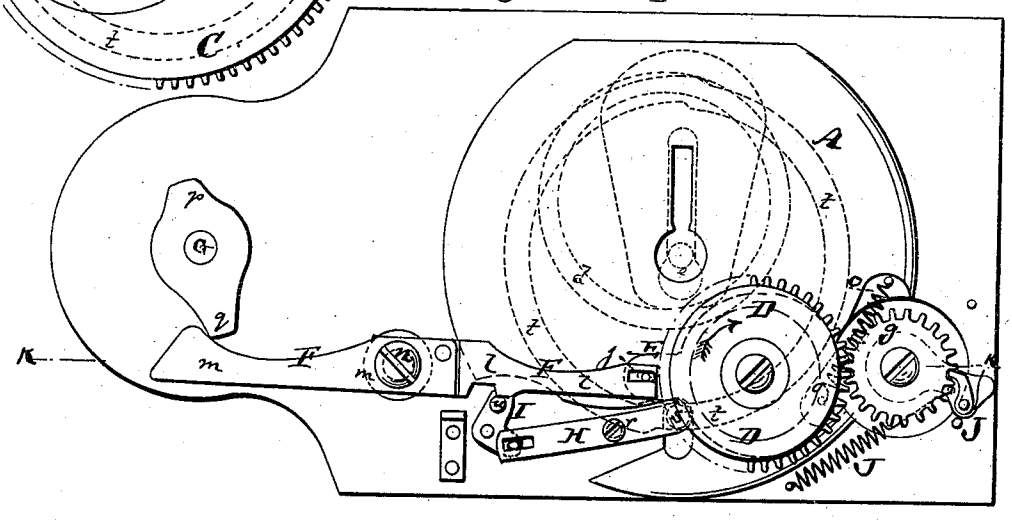


Fig: 4

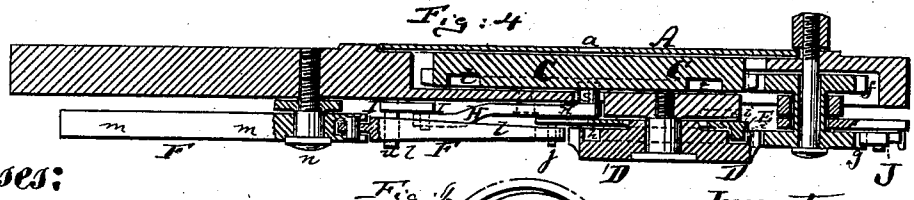
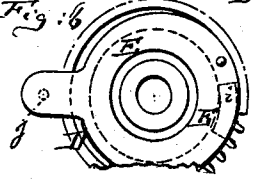


Fig: 6



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UNITED STATES PATENT OFFICE.

FRIEDRICH ERNST SCHMIDT AND JOHN SIEBELS FREESE, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN BUTTON-HOLE ATTACHMENTS FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. **183,333**, dated October 17, 1876; application filed June 14, 1876.

To all whom it may concern:

Be it known that we, FRIEDRICH ERNST SCHMIDT and JOHN SIEBELS FREESE, both of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Button-Hole Attachment for Sewing-Machines, of which the following is a specification:

This invention relates to improvements in the feed mechanism usually employed on the sewing-machine known as the "Union Button-Hole Machine," but is also applicable to button hole machines of different construction.

The invention consists, first, in the use of a peculiar jointed lever, and in its combination with an automatically-adjustable stop, for regulating the speed of the feed in proper degree, causing it to be slower when the cloth-clamp describes a curve than when it moves in a straight line. The automatic stop is adjusted by a cam groove or guide formed in or on the intermittently-rotating feed-wheel. The jointed lever is oscillated, and imparts motion to the feed-wheel by a vibrating friction-lug, which enters a circular groove in the under side of the feed-wheel, or of a pinion connected therewith. The invention also consists in the application to the feed-wheel of a peculiar stop for centering the clamp preparatory to the operation of cutting the button-hole, and also in the arrangement of an adjustable mechanism for arresting the rotation of the feed-wheel and regulating the length of the stitching along the button-hole, all as hereinafter more fully described.

In the accompanying drawing, Figure 1 represents a top view, partly in section, of the work-plate of the sewing-machine to which our improvements are applied. Fig. 2 is a bottom view of said work-plate. Fig. 3 is a vertical transverse section of the same on the line *c c*, Fig. 1. Fig. 4 is a vertical longitudinal section of the same on the line *k k*, Fig. 2. Fig. 5 is a detail top view of the feed-wheel. Fig. 6 is a top view of the friction mechanism employed for moving the feed-wheel.

Similar letters of reference indicate corresponding parts in all the figures.

The letter A represents the work-plate of the machine, made with the slot *a*, in the usual manner, through which the pin *b* of the clamp B reaches the eccentric groove *d* in the feed-wheel C, all as in the button-hole machines now in use. The clamp B is slotted, as usual, moves on the fixed center *e* on the work-plate, and is otherwise of the ordinary or suitable construction. The feed-wheel has a toothed edge, and is placed beneath the plate A, concentric with the projecting center *e*. Its toothed edge is in gear with a pinion, *f*, which is rigidly joined to another pinion, *g*, that is in gear with a toothed driving-wheel, D, all as clearly indicated in Fig. 4.

One face of the wheel D contains an annular concentric groove, *h*, into which enters a lug, *i*, whose outer edge is more or less eccentric to the groove *h*. Said lug *i* (shown in Figs. 4 and 6) projects from an annular plate, E, which, by a pin, *j*, connects with one member, *l*, of a jointed lever, F, and which is placed around the hub of the wheel D, as shown in Fig. 4. The other member, *m*, of said lever is pivoted at *n* to the under side of the work-plate. A spring, *o*, connects with the plate E or lever F, and tends to counteract the effect of the operating-toes *p* and *q* on the lever F. These toes, of which one is much shorter than the other, project from a rotary shaft, G, and strike alternately against the member *m* of the lever F, thereby vibrating the said lever on its pivot *n*, and swinging also the plate E, so as to cause its lug *i* to bind in the groove *h*, and turn the wheel D in the direction of arrow shown in Fig. 2.

As soon as a toe has struck the lever F with the effect just mentioned, the spring *o* draws the parts E and F back to their normal position, the lug *i* moving loose in the groove *h* during such return motion. The joint between the parts *l* and *m* is such that the lever F is practically rigid when moved by a toe, *p* or *q*, but jointed whenever the part *l* is struck on its outer edge, for purposes hereinafter pointed out.

By the arrangement of the parts F, E, *i*, D, and *o* in manner described, we are enabled to actuate the feed-wheel entirely by friction, in a gentle and noiseless manner, and to dis-

pense with the noisy pawl-and-ratchet mechanism now usually employed, and with the danger of breakage connected therewith.

Instead of forming the groove *h* in the wheel D, it may be formed directly in the feed-wheel C, with substantially the same effect.

H is a lever, pivoted at *r* to the under side of the plate A, or to the frame of the machine, and provided at one end with a pin, *s*, that projects through said plate into a groove, *t*, formed in the under side of the feed-wheel C. This groove is, as indicated by dotted lines in Fig. 5, at one part smaller in diameter than at another part, and its form is already well known on the feed-wheels of button-hole machines. The other end of the lever H connects with a bell-crank, I, which has a projecting pin, *u*, near the outer edge of the link *l*, and which is also pivoted to the under side of the plate A, as indicated in Fig. 2. Whenever the pin *s* of the lever H is in the smaller part of the groove *t*, as in Fig. 2, it will swing the pin *u* of the bell-crank I in the way of the link *l*, and thereby reduce the stroke of the lever F and the consequent speed of the feed-wheel. In fact, not only the stroke of the lever is thereby reduced, but also the number of strokes, as it is held by the pin *u* out of contact with the shorter toe *p* of the shaft G. Thus, by the arrangement of the lever H and bell-crank I, we are enabled to automatically regulate the speed of the feed-wheel, causing it to turn much more rapidly when the pin *s* is in the larger part of the groove *t* than when in the smaller part. This adjustment of speed is necessary, as the cloth must be fed slower while describing the curve, and while the rounded part of the button-hole is being stitched, than during the stitching of the straight sides of the button-hole. It is evident from the foregoing that when the pin *s* travels in the larger part of the groove *t* the bell-crank I will not affect the lever F, and that, in consequence, said lever will again come within reach of the toe *p*, and also have its stroke enlarged.

In order to enable the operator to rapidly bring the feed-wheel C into the starting position—*i. e.*, with its slot in line with the straight portion of the slot *a* of the plate A—without setting the needle mechanism into operation, or otherwise displacing any part of the apparatus, we have supplied the machine with a separate hand-feed and spring-pawl attachment, J, which engages into the toothed wheel *g*, and connects with a suitable handle or treadle. The operator, after a button-hole has been finished, is thereby enabled to bring the feed-wheel to the normal position by merely actuating the spring-pawl attachment J, while the remainder of the machine is at rest. When or before the feed-wheel has been brought to its normal position, the clamp B is to be placed in the position shown in Figs. 1 and 3—that is, with its pin *b* inserted through an aperture of the plate A outside of the feed-wheel proper. In this position the slot of the clamp is directly over the straight part of the slot *a*, and also over the slot in the feed-wheel, and the parts are thus in position for cutting a new button-hole. Now, in order to arrest the motion of the feed-wheel as it is rapidly being turned by the spring-pawl attachment J, we have provided it at its edge with a projecting pin, *v*, which is in line radially with the slot in the feed-wheel, and strikes the lower part of the pin *b* as soon as the feed-wheel arrives in its normal position, provided, of course, the clamp has been placed as stated. Thus the operator is, by the pin *v*, relieved from the task of anxiously watching for the arrival of the feed-wheel in the normal position.

L is an adjustable, perforated, or slotted gage, placed in the machine in such position that its end, or a pin, *w*, thereon, may be brought in the way of the pin *v* on the feed-wheel. This is for the purpose of enabling the operator to gage his machine for button-holes of greater or less length, according as the gage L is less or more deeply introduced. After the button-hole has been cut the clamp is placed with its pin *b* into the groove *d*, and the feed then worked by the spring-pawl attachment J until the pin *v* strikes the gage L. That is the signal for starting the stitching mechanism, which is done as soon as the gage has been swung or drawn out of the way of the pin. For making short button-holes the gage is inserted to a greater depth than for long button-holes, the effect being to let a larger part of the motion of the feed-wheel go to naught—that is, without a simultaneous action of the stitching mechanism.

We claim as our invention—

1. The combination of the lever F with the annular plate E, eccentric lug *i*, spring *o*, and with the grooved wheel D, the lug *i* being rigidly attached to the annular plate E, which turns on the hub of the wheel D, substantially as herein shown and described.

2. The combination of the lever H, having the pin *s*, with the feed-wheel C, and with the bell-crank I, having the pin *u*, substantially as herein shown and described.

3. The shaft G, made with a shorter toe, *p*, and a longer toe, *q*, combined with the feed-lever F and with the automatic stop I, substantially as herein shown and described.

4. The feed-wheel C, provided with the projecting pin *v*, and combined with the pin *b* of the clamp B, all arranged so that the motion of the feed-wheel will be automatically arrested by the pins *v* and *b*, substantially as specified.

5. In combination with the feed-wheel C, which has the pin *v*, the adjustable gage L, arranged to operate substantially as herein shown and described.

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