

(No Model.)

4 Sheets—Sheet 1.

P. DIEHL.

BUTTON HOLE SEWING MACHINE.

No. 322,428.

Patented July 21, 1885.

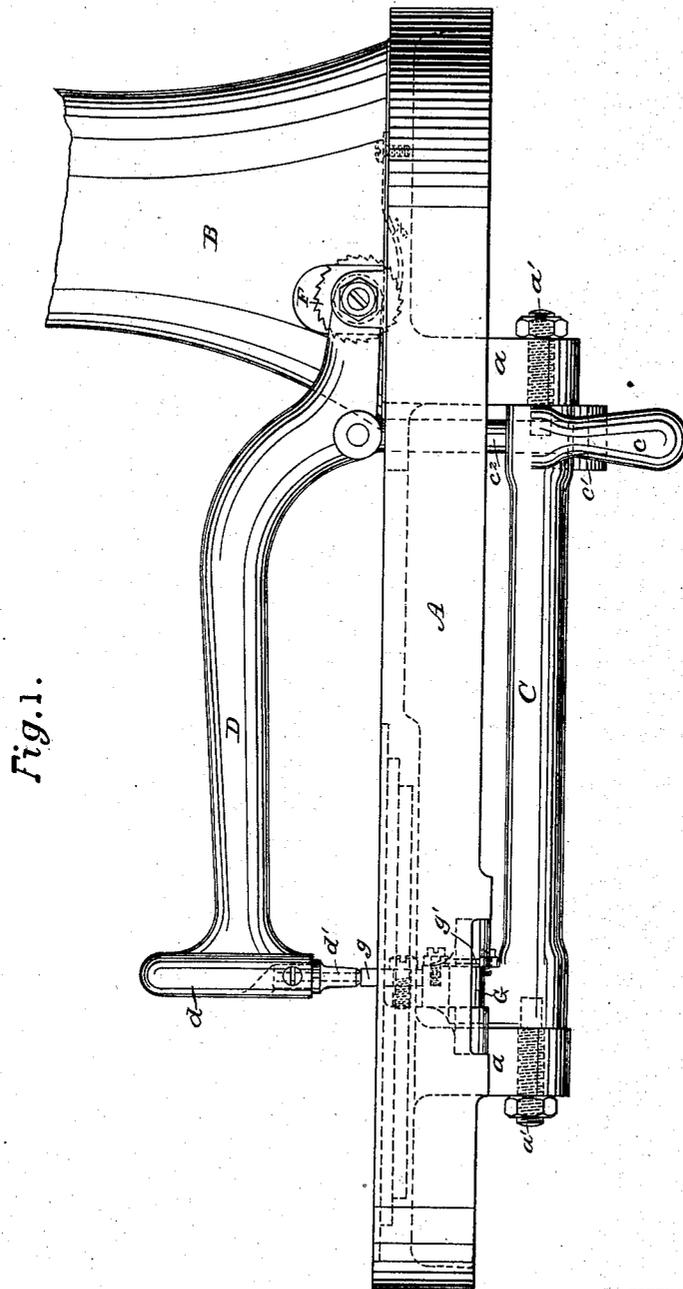


Fig. 1.

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Fig. 3

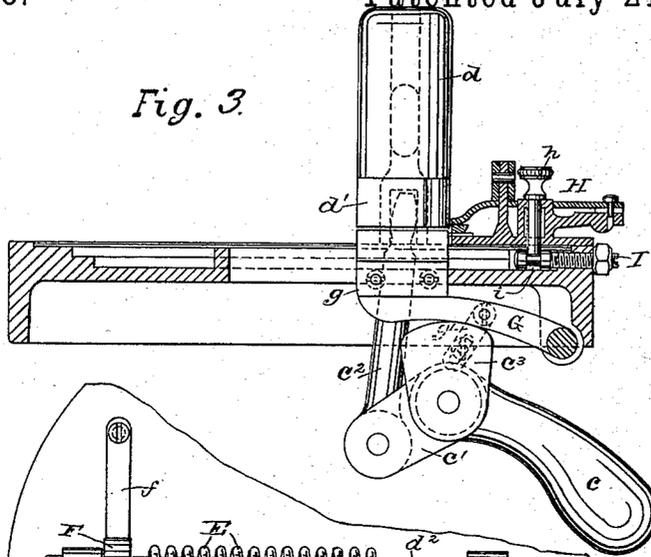


Fig. 2.

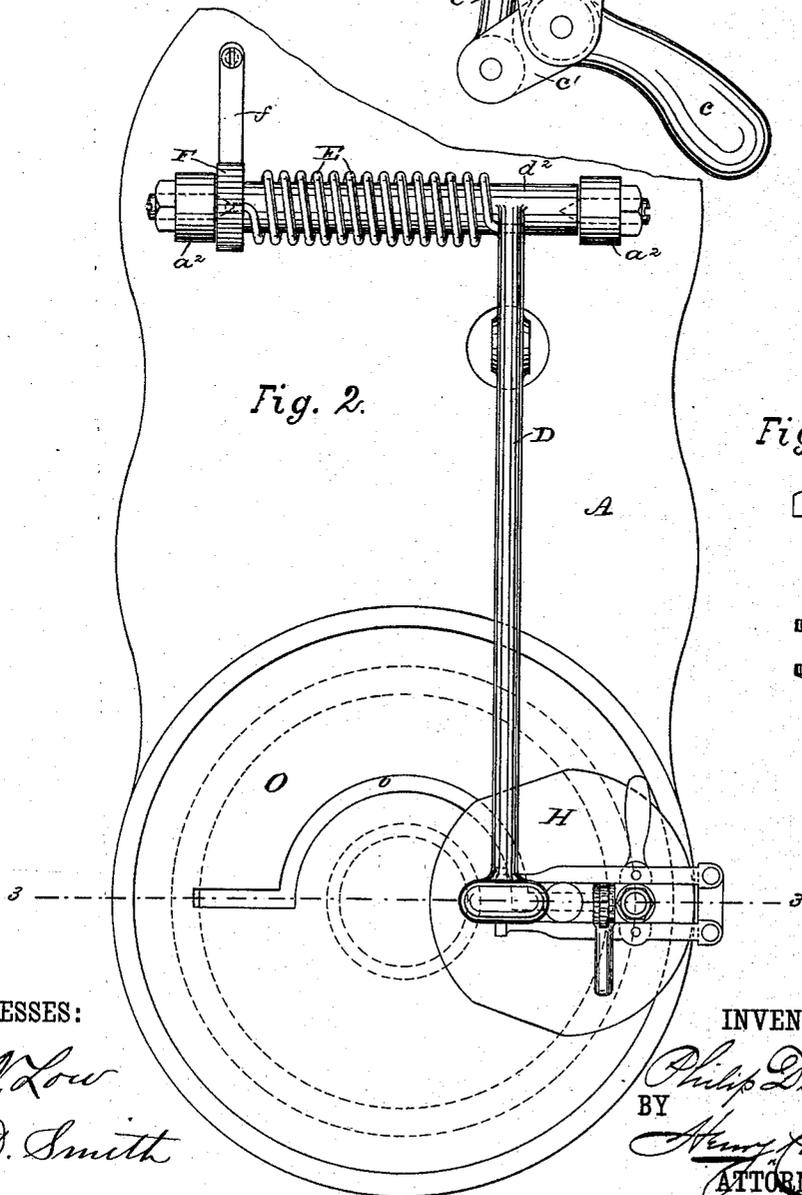


Fig. 4.



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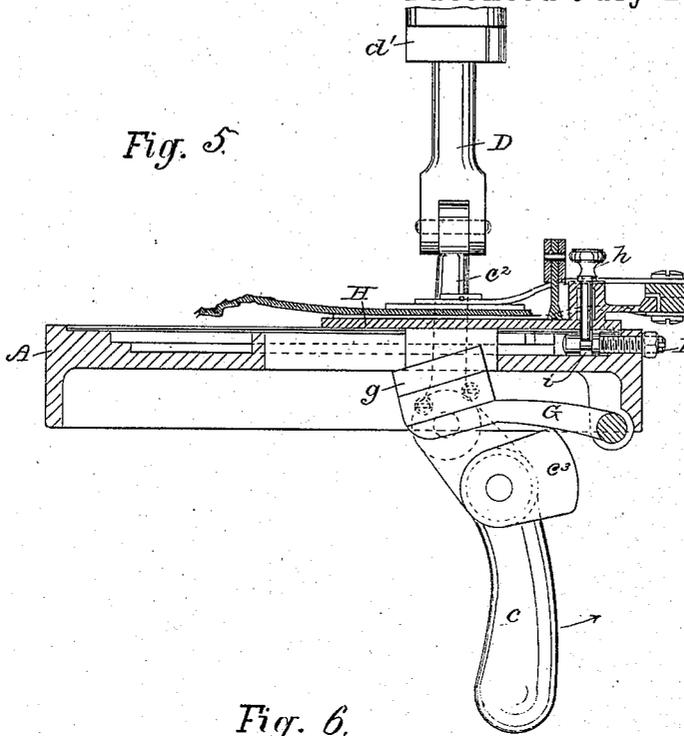
4 Sheets—Sheet 3.

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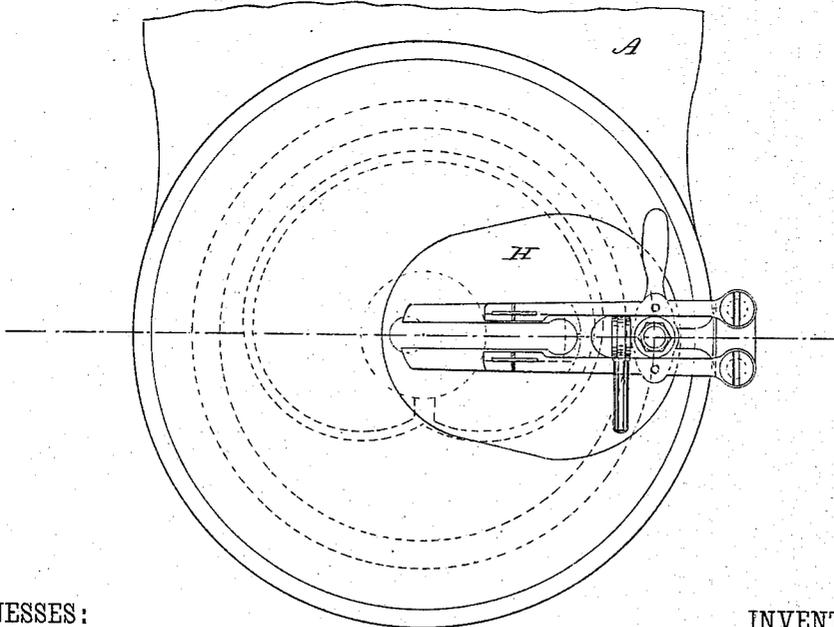
BUTTON HOLE SEWING MACHINE.

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*Fig. 6.*



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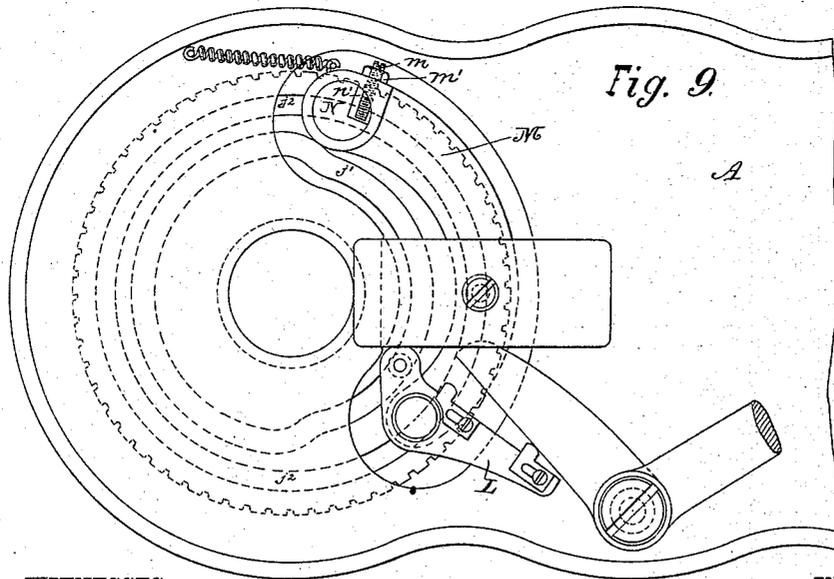
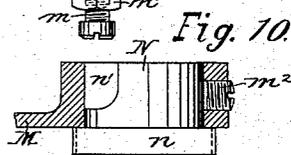
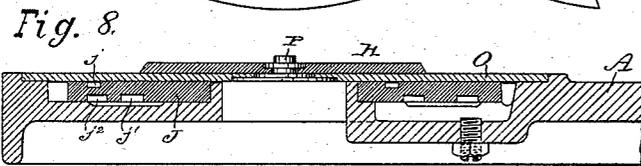
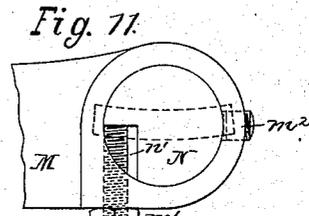
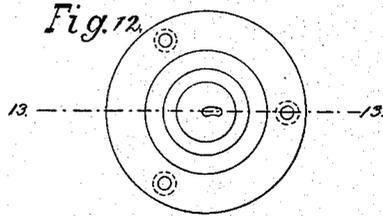
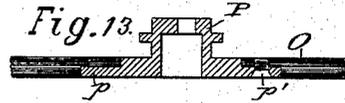
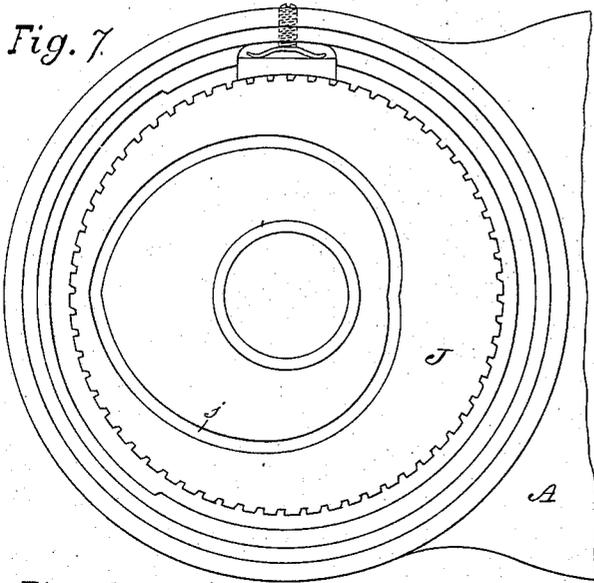
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BUTTON HOLE SEWING MACHINE.

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# UNITED STATES PATENT OFFICE.

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## BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 322,428, dated July 21, 1885.

Application filed February 11, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIP DIEHL, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Button-Hole Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to that class of button-hole sewing-machines in which the fabric is held in a clamp while the button-hole is being cut, the clamp and fabric being afterward moved over the work-plate of the machine by a suitable feeding mechanism in the proper directions to enable the stitch-forming mechanism to work the button-hole.

The object of my invention is to improve the button-hole-cutting mechanism; to provide means for bringing the cloth-clamp into proper adjustment relative to the cutting-knife when the button-hole is to be cut; to remedy an existing objection in the work-plates by which the cloth-clamps are sustained and guided by providing such plates with removable guiding-buttons, and to improve the feeding mechanism by which the cloth-clamp is traversed over the work-plate.

In the drawings, Figure 1 is a side view, showing my button-hole-cutting mechanism in operative position relative to the table or work-plate of a button-hole machine. Fig. 2 is a plan view of the same, showing the cloth-clamp in position for the button-hole to be cut. Fig. 3 is a section of the work-table and cloth-clamp on line 3 3, Fig. 2, showing the cutting mechanism in end elevation in the position it occupies the moment the button-hole is cut. Fig. 4 is a detail view of the adjustable retaining device for the cloth-clamp. Fig. 5 is a view similar to Fig. 3, but with the cutting mechanism thrown out of action. Fig. 6 is a plan view of the cloth-clamp and front portion of the work-table. Fig. 7 is a plan view of the feeding-wheel and part of the work-table. Fig. 8 is a section of the same and of the work-plate and cloth-clamp. Fig. 9 is a reverse plan view of the front portion of the work-table, showing the feeding mechanism. Figs. 10 and 11 are detail views of

the feeding cramping-block and a part of its carrying-arm. Fig. 12 is a plan view of a removable guiding-button; and Fig. 13, a section of the same on line 13 13, Fig. 12, showing it attached to the work-plate of the machine.

A indicates the work-table of a button-hole sewing-machine, and B a portion of the bracket-arm thereof. The table A is provided with depending lugs *a*, to which is pivoted, by means of adjustable screw-pins *a'*, a rock-shaft, C, having a handle, *c*, by which it is operated, and an arm, *c'*, loosely connected by a link, *c''*, to a weighted cutter-carrying lever, D, placed above the work-table. The lever D is provided with a heavy head, *d*, to which is attached the cutter *d'*, the said lever being preferably pivoted by a rock-shaft, *d''*, formed integral with said lever and sustained by pointed screw-pins passing through upwardly-projecting lugs *a''* on the work-table A.

To retain the cutting-lever D normally in an elevated position, out of the way of the operator when sewing, a counterbalancing-spring is provided, said spring being here shown as a coiled torsional spring, E, surrounding the rock-shaft *d''*, and one end of said spring being connected with said shaft or lever and the other end thereof entering a hole in a ratchet-wheel, F, placed loosely on said shaft, so that it may remain stationary when the latter turns. The ratchet-wheel F is engaged and held stationary by a spring-pawl, *f*, attached to the table A. It is obvious that by turning said ratchet-wheel the stress of the counterbalancing-spring E may be adjusted, as circumstances may require.

Beneath the work-table A is pivoted an arm, G, carrying the cutting-block *g*, which co-operates with the cutter *d'*; said block being forced upward through an opening in the table as the cutter descends by a cam, *e''*, attached to the forward end of the rock-shaft C. The arm G is preferably loosely connected to the cam *e''* by a slotted link, *g'*, so that the backward movement of the said cam will insure the descent of the said arm and the cutting-block.

The operation of this part of my invention is as follows: When a button-hole is to be cut

the cloth-clamp H, with its clamped material, is placed in position, as indicated in Figs. 3 and 5, said clamp being held in place by a pin, *h*, engaging a suitable recess in the work-table. Said recess is usually a fixed hole; but to provide for the proper adjustment of the clamp relative to the cutter, to locate the button-hole properly, I prefer to employ an adjustable screw-pin, *I*, tapped in the work-table, and having near its inner end an annular recess, *i*, in which the lower end of the pin *h* fits. To cut the button-hole, the operator grasps the handle *c* and moves it quickly upward in the direction indicated by the arrow in Fig. 5. This movement of the said handle and of the rock-shaft C, to which it is attached, causes the weighted cutting-lever to descend with great force to the position shown in Figs. 1 and 3, the momentum of the said lever and of the weighted head *d* plunging the cutter *d'* through the material and against the cutting-block *g*, which latter rises by the action of the cam *c*<sup>3</sup> as the cutter descends. As soon as the handle *c* is released by the operator the counterbalancing-spring E returns the parts to their normal positions, lifting the cutting-lever out of the way of the operator.

The feeding mechanism for the cloth-clamp which I prefer to use is essentially the same as is fully shown and described by my Patent No. 272,126, dated February 13, 1883, excepting as to the means for adjusting the cramping-block.

J indicates the feeding-wheel, having in its upper face the feeding-groove *j* for engaging the pin of the cloth-clamp, and in its lower face the grooves *j'* and *j''*, the former for operating the shipper device L, forming part of the feed-operating mechanism, and the latter for the reception of the flange of the cramping-block.

To the shipper device L is pivoted the link or arm M, carrying at its outer end the cramping-block N, said block having a rib or flange, *n*, fitting loosely in the groove *j''* when moved in one direction and cramping therein when moved in the opposite direction, as in my patent above referred to, for the purpose of giving an intermittent rotary movement to the feed-wheel J in the usual manner.

To render the cramping-block adjustable on its vertical axis to compensate for the wear of its flange *n* in the groove *j''*, said block is made circular in form, and is fitted in a circular recess in the arm M. An adjusting-screw, *m*, passes through said arm into a recess, *n'*, in said block, and by means of said screw the latter can be adjusted to vary the position of the rib or flange *n* in the groove *j''*. A set-nut, *m'*, serves to secure the screw *m* in any position to which it may be adjusted, and a set-screw, *m''*, is also provided to fasten the block M in place after adjustment.

O indicates the work-plate of the machine, having the usual guiding-slot *o*, through which the pin of the cloth-clamp passes into the groove *j* of the feeding-wheel. The work-

plate is provided with a guiding-button, P, for the cloth-clamp, said button having near its top an outwardly-projecting flange or lip for holding the cloth-clamp down against the work-plate. These buttons have heretofore been permanently attached to or formed integral with the work-plates; but by reason of the wear and strain to which said buttons are subjected they are liable to become worn or broken, so that they are unfit for use, and a new plate is then required. To obviate this objection, my button P is formed separate from the work-plate O, and is attached thereto in any suitable manner, preferably by providing it with an annular flange, *p*, recessed into the lower side of the plate O, the button being secured to the latter by the screws *p'* passing through said flange into the said plate. Thus, when the button becomes worn or broken, it may be readily removed from the work-plate and replaced by a new one at little expense.

I claim as my invention—

1. In a button-hole sewing-machine, the combination, with the work-table, of a weighted cutting-lever above said table, a cutter carried by said lever, a cutting-block, a pivoted arm beneath said table by which said block is carried, a rock-shaft having a handle and an arm, a link connecting said arm with the said cutting-lever, and a cam for forcing said cutting-block upward when the said cutting-lever descends, substantially as set forth.

2. The combination of the work-table A, rock-shaft C, having handle *c*, arm *c'*, and cam *c*<sup>3</sup>, link *c*<sup>3</sup>, cutting-lever D, cutter *d*, cutting-block *g*, its carrying-arm G, rock-shaft *d*<sup>2</sup>, spring E, ratchet-wheel F, and pawl *f*, substantially as set forth.

3. In a button-hole sewing-machine, the combination, with the work-table, the button-hole-cutting mechanism, the cloth-clamp, and a pin projecting below the under side of the latter, of an adjustable device, as a screw-pin, provided with a recess for the engagement of the pin of the cloth-clamp, whereby the position of the latter, when the button-hole is to be cut, may be varied to locate the button-hole properly, substantially as set forth.

4. In a button-hole sewing-machine, the combination, with the grooved feeding-wheel and the link or arm by which said wheel is operated, of a cramping-block adjustable in said link or arm, having a rib or flange adapted to work in a groove in said wheel, substantially as set forth.

5. In a button-hole sewing-machine, the combination, with the grooved feeding-wheel and the link or arm for operating the same, of an axially-adjustable cramping-block having a rib or flange loosely fitting a groove in said wheel, an adjusting-screw for changing the position of said block in said link or arm, and a set-screw for securing said block after adjustment, substantially as set forth.

6. In a button-hole sewing-machine, the combination, with a work-plate having a guiding-slot for the cloth-clamp pin, of a guiding-

button detachably secured to said work-plate and provided with an outwardly-projecting flange or lip for holding down the cloth-clamp, substantially as set forth.

5 7. In a button-hole sewing-machine, a work-plate having a guiding-slot for the cloth-clamp pin, and a guiding-button having near its top an outwardly-projecting flange or lip and provided at its base with an annular  
10 flange recessed into said work-plate, combined

with means, as screws passing through said flange, for detachably securing said button to said work-plate, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

PHILIP DIEHL.

Witnesses:

JAMES REID,  
JOSEPH F. JAQUITH.