No. 856,014. PATENTED JUNE 4, 1907.

E. B. ALLEN & W. E. GOODYEAR.

BUTTONHOLE SEWING MACHINE.

APPLICATION FILED JAN. 8, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

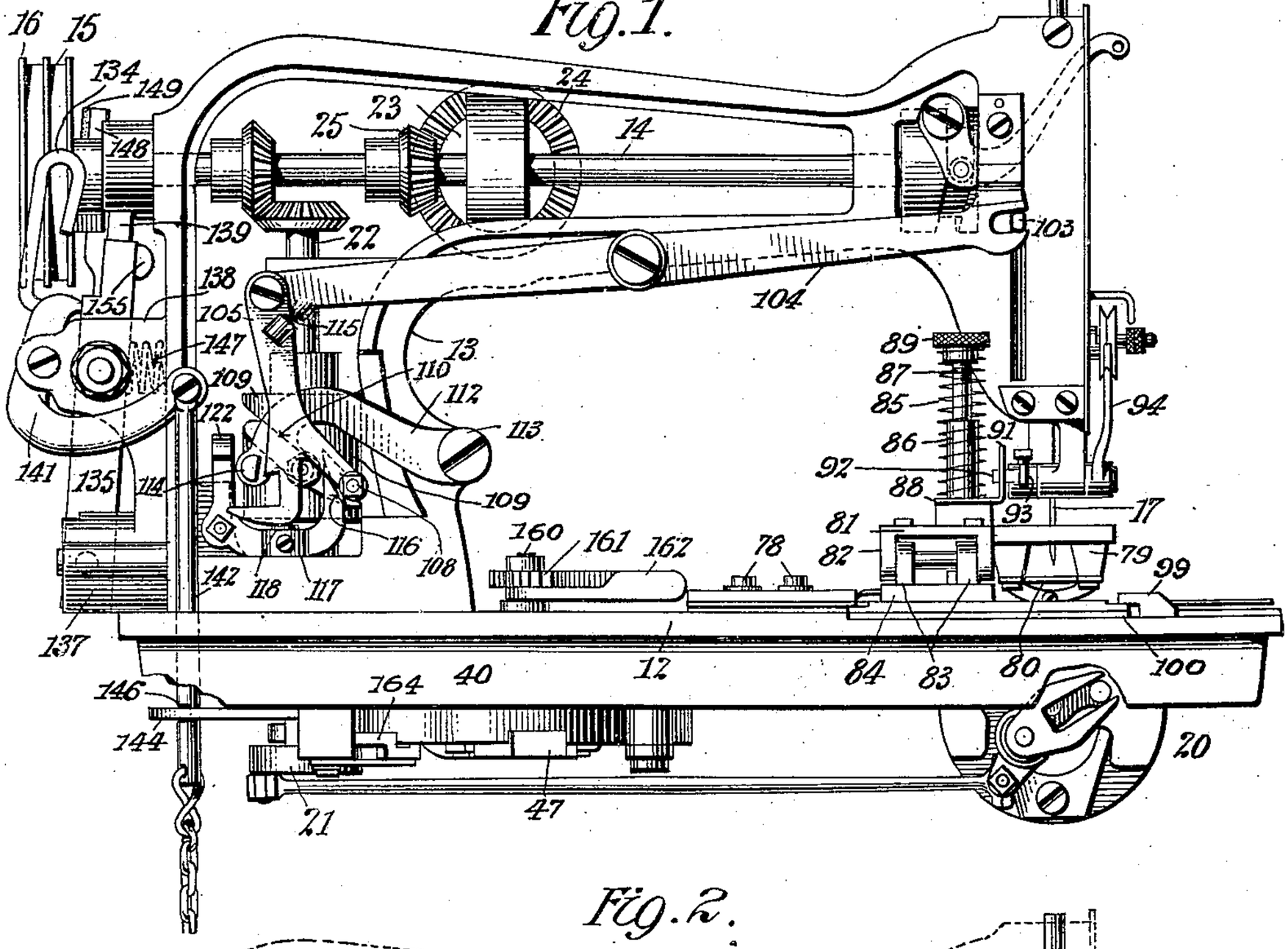
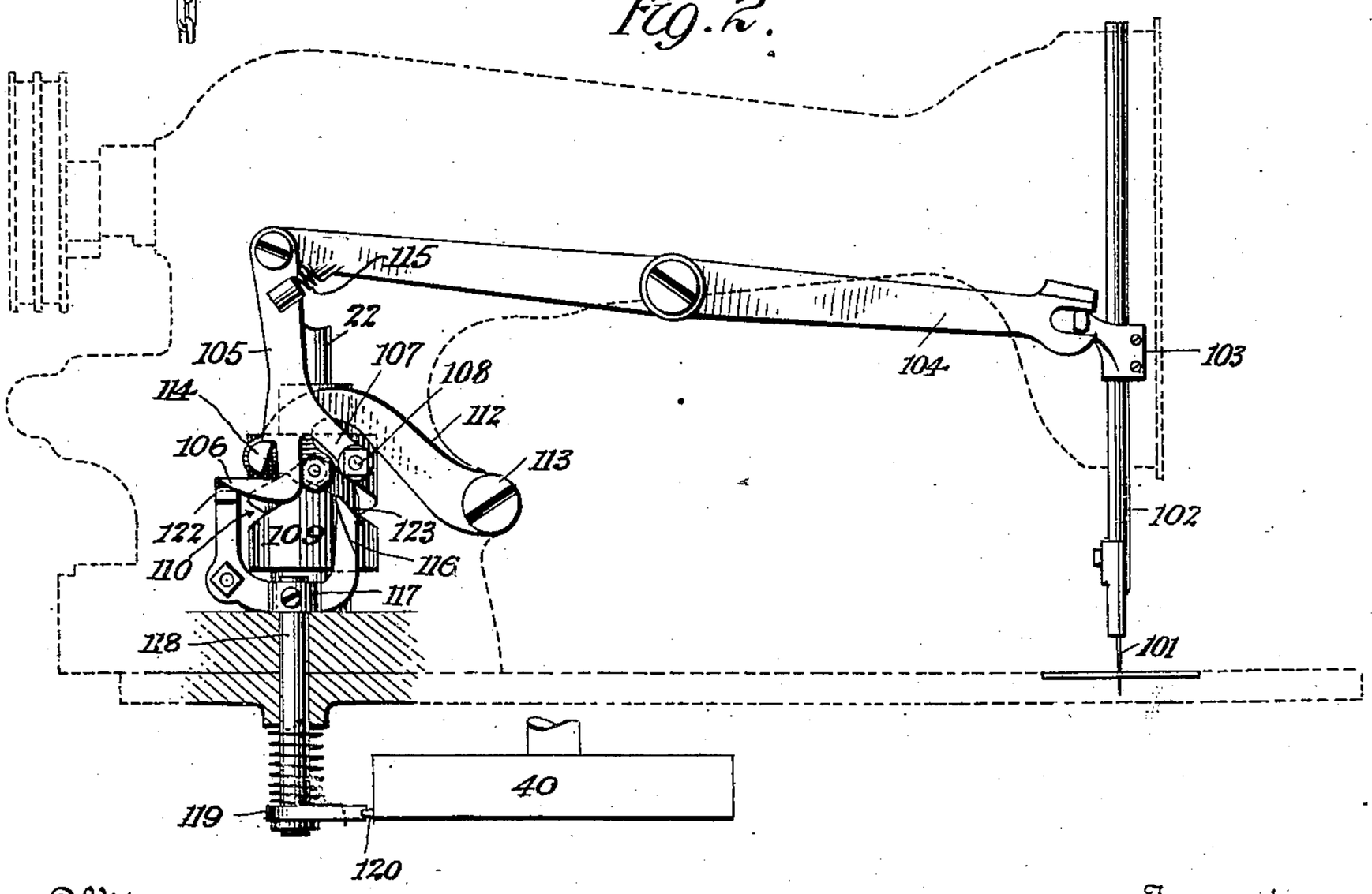


Fig. 2.



Witnesses:
Frank S. Ober
C. M. Sweeney.

Inventors:
Edward B. Allen
Wm E. Goodyear,
By their Attorney
Henry Calver

No. 856,014. PATENTED JUNE 4, 1907.

E. B. ALLEN & W. E. GOODYEAR.

BUTTONHOLE SEWING MACHINE.

APPLICATION FILED JAN. 8, 1906.

2 SHEETS—SHEET 2.

Fig. 8.

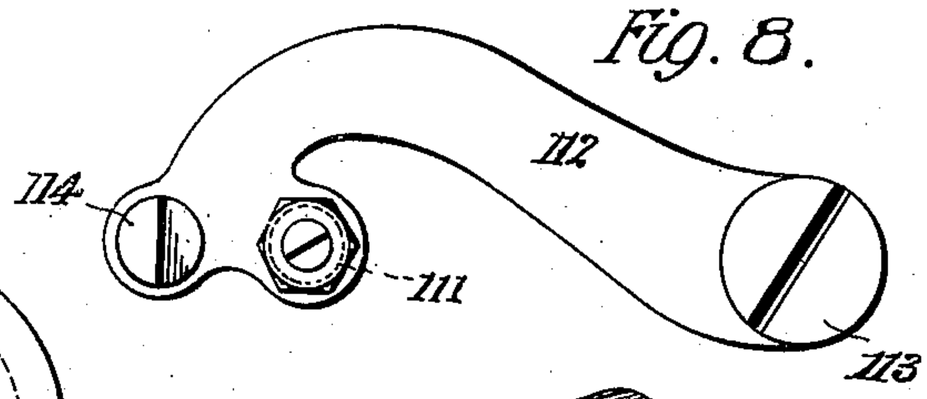


Fig. 3.

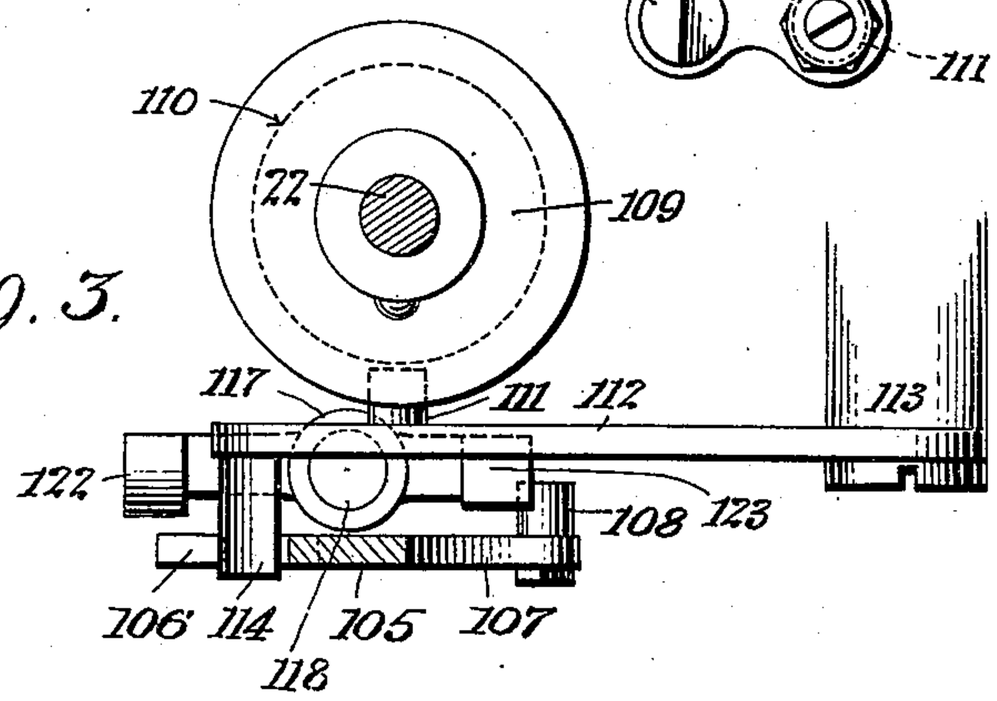


Fig. 6.

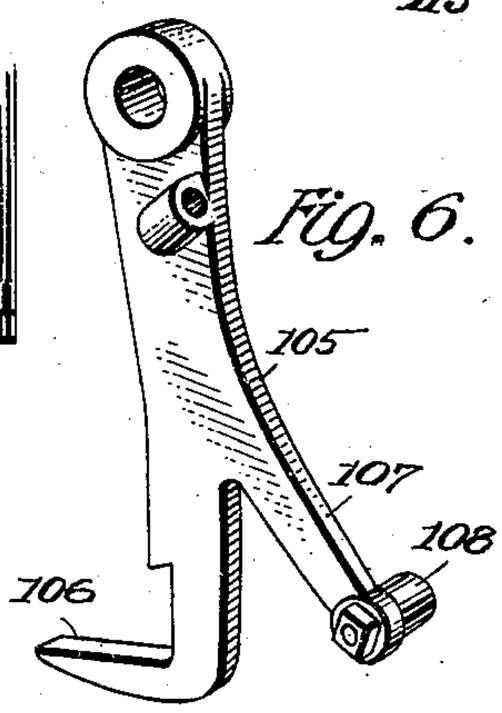


Fig. 4.

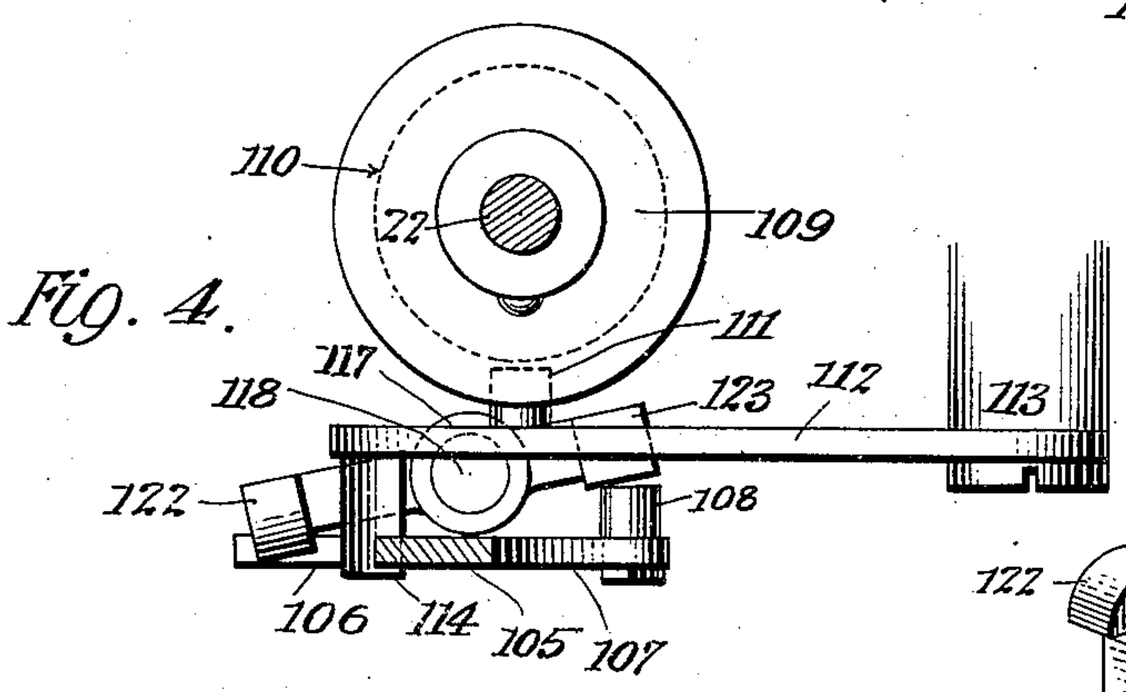


Fig. 7.

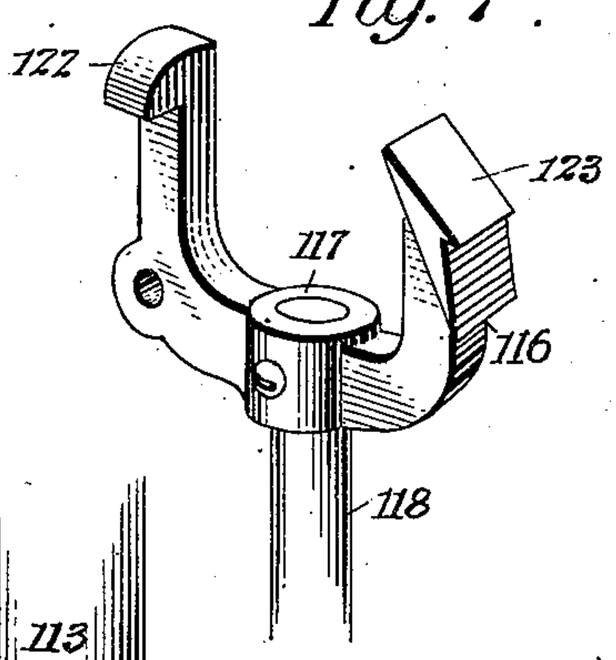
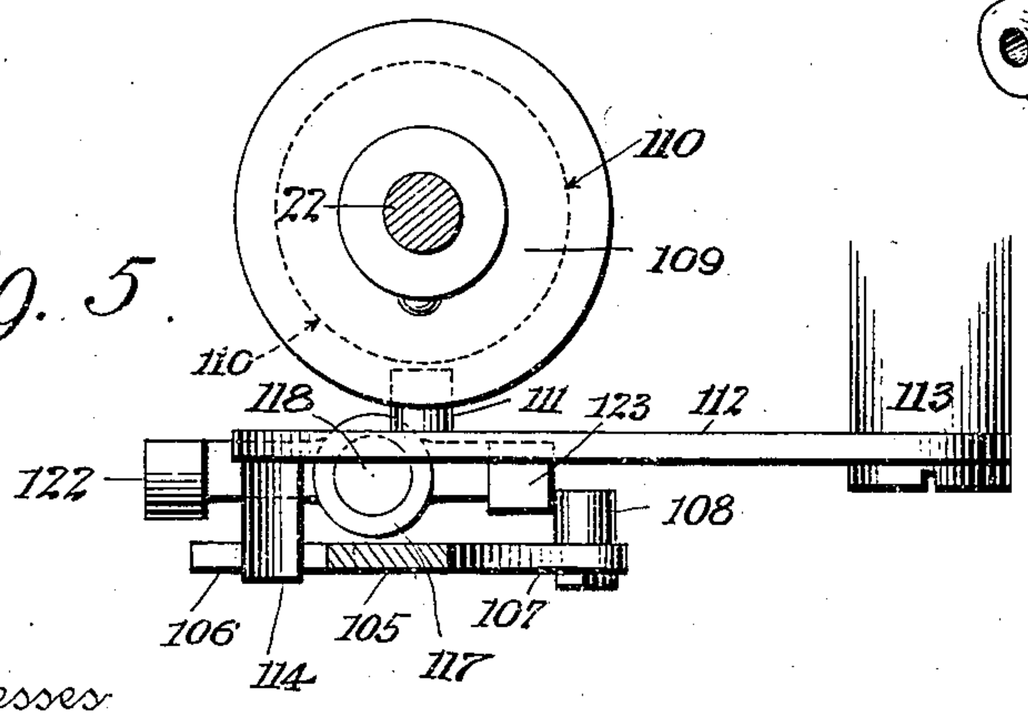


Fig. 5.



Witnesses
Frank S. Allen
C. M. Sweeney

Inventors:
Edward B. Allen
Wm. E. Goodyear
By their Attorneys Henry Lalor & Co.

UNITED STATES PATENT OFFICE.

EDWARD B. ALLEN, OF ELIZABETH, AND WILLIAM ED. GOODYEAR, OF NEWARK, NEW JERSEY, ASSIGNORS TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

BUTTONHOLE-SEWING MACHINE.

No. 856,014. Specification of Letters Patent. Patented June 4, 1907.

Application filed January 8, 1906. Serial No. 295,077.

To all whom it may concern:

Be it known that we, EDWARD B. ALLEN and WILLIAM E. GOODYEAR, citizens of the United States, residing, respectively, at Elizabeth, in the county of Union, and Newark, in the county of Essex, State of New Jersey, have invented or discovered certain new and useful Improvements in Buttonhole-Sewing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improved button-hole cutting mechanism more especially intended for use with "straight" button-hole stitching machines, and which improved mechanism is comparatively simple in construction and strong and positive in operation.

In the accompanying drawings Figure 1 is a side view of a button-hole stitching machine embodying the invention, and Fig. 2 shows the cutting mechanism alone with other parts omitted or represented by dotted lines, for clearness of illustration. Figs. 3 to 8, inclusive, are detail views, on a larger scale, of some parts of the cutter-operating mechanism, with parts in different positions in some of the different views, as hereinafter explained.

Referring to the drawings, 12 denotes the work-plate, 13 the arm of the machine and 14 the main shaft journaled in the upper part of said arm, and provided at its rear end with the fast and loose pulleys 15, 16.

The stitch-forming mechanism of the machine is of an old and well-known character and comprises the needle 17 carried by the needle-bar 18 having a crank and pitman connection (not shown) with the forward end of the main shaft 14 so as to reciprocate vertically in a horizontally swinging frame or gate, said needle co-operating in the usual manner with an oscillating shuttle working in the shuttle race 20 and operated from a crank 21 at the lower end of the vertical shaft 22 geared to the main shaft so as to rotate co-incidently therewith.

The button-hole cutter 101 is carried by a cutter-bar 102 guided vertically in the head of the machine and provided with an arm or bracket 103 a portion of which is engaged by the forked forward end of a cutter-operating lever 104 to the rear end of which is pivotally attached a depending latch-lever 105 provided with a hook 106 and with an arm 107 carrying a pin or roller-stud 108. The vertical shaft 22 carries a cam cylinder 109 having a cam groove 110 entered by a pin or roller-stud 111 on an actuating lever 112 pivoted to the bracket arm at 113 and having at its free end an outwardly projecting lug or pin 114 with which the hook 106 of the latch-lever 105 is engaged when the cutter is to be actuated. The hook 106 on the latch-lever 105 is normally held out of engagement with the pin or lug 114 on the lever 112 (toward which pin or lug said hook is constantly pressed by the spring 115) by the engagement of the pin or roller-stud 108 with the part 116 of an oscillating fork 117 attached to the upper end of rock-shaft 118 provided at its lower end with an arm 119 extending into the path of movement of a tripping lug or projection 120 on the intermittingly rotated feed wheel 40, so that at a proper time, and preferably just before the last stitches of a button-hole are being formed, the said lug or projection 120 will strike the said arm and impart a slight rocking or turning movement to the shaft 118 and to the oscillating fork 117, against the stress of the torsional and depressing spring 121, sufficient to permit the pin or roller-stud 108 to pass by the arm of said fork (see Fig. 4) and thus bring the hook 106 into the path of movement of the constantly reciprocating pin or lug 114 on the lever 112 so that, at the next succeeding upward movement of said lever, the cutter-operating lever 104 will be actuated to depress the cutter and cut a button-hole slit in the work. This operation will be best understood by reference to Fig. 2 which shows the parts in cutting position, with the pin or lug 114 in engagement with a shoulder at the top of the recess in the hook 106.

One arm of the oscillating fork 117 is provided with a hook 122 and which hook, when the said fork is turned to release the pin or roller-stud 108, is brought above the toe portion of the hook 106 (see Fig. 4) so that the said fork and the shaft 118 to which it is attached are lifted slightly by said hook, against the stress of the torsional and depressing coil spring 121, to disengage the arm 119 from the tripping lug or projection 120 on the feed-wheel and thus allow the

said fork to resume its normal position (see Fig. 5) so that when the actuating lever 112 descends the pin or roller-stud 108 will ride down the incline 123 on the said fork and thus withdraw the hook 106 from engagement with the lug or pin 114 on the lever 112, and thus disconnect the cutter-operating lever 104 from its actuating lever and place the parts in proper position for the next cutting operation.

Having thus described our invention we claim and desire to secure by Letters Patent:

1. In a button-hole stitching machine, the combination with a stitch-forming mechanism, a work-clamp and feeding mechanism for said clamp, of a button-hole cutting mechanism comprising a reciprocating cutter-bar located in the head or forward part of the machine and provided with a knife or cutter, and operating mechanism for said cutter-bar comprising a constantly moving part or lever, a vertical shaft located at the rear part of the machine, and from which said constantly moving part or lever is actuated, a cutter-bar operating lever extending lengthwise of the machine from said cutter-bar to said constantly moving part or lever, and automatic coupling means for connecting said operating lever with said constantly moving part or lever when a button-hole is to be cut.

2. In a button-hole stitching machine, the combination with a stitch-forming mechanism, a work-clamp and feeding mechanism for said clamp, of a button-hole cutting mechanism comprising a reciprocating cutter-bar located in the head or forward part of the machine and provided with a knife or cutter, and operating mechanism for said cutter-bar comprising a constantly moving part or lever, a vertical shaft located at the rear part of the machine and from which said constantly moving part or lever is actuated, a cutter-bar operating lever extending lengthwise of the machine from said cutter-bar to said constantly moving part or lever, and automatic coupling means for connecting said operating lever with said constantly moving part or lever when a button-hole is to be cut, said automatic coupling means comprising a swinging latch-lever means for holding said latch-lever out of engagement with said constantly moving lever, and automatic means for tripping or releasing said holding means.

3. In a button-hole stitching machine, the combination with a stitch-forming mechanism, a work-clamp and feeding mechanism for said clamp, of a button-hole cutting mechanism comprising a reciprocating cutter-bar provided with a knife or cutter, and operating mechanism for said cutter-bar comprising a constantly moving part or lever, a cutter-bar operating-lever, and automatic coupling means for connecting said operating lever with said constantly moving part or lever when a button-hole is to be cut, said automatic coupling means comprising a spring-pressed latch-lever having a hook, an oscillatory fork for holding said latch-lever out of engagement with said holding lever, and tripping means for moving said fork to release said latch-lever when the coupling operation is to be effected.

4. In a button-hole stitching machine, the combination with a stitch-forming mechanism, a work-clamp, and feeding mechanism for said clamp, of a button-hole cutting mechanism comprising a reciprocating cutter-bar provided with a knife or cutter, and operating mechanism for said cutter-bar comprising a constantly moving part or lever, a cutter-bar operating-lever, and automatic coupling means for connecting said lever with said constantly moving part or lever when a button-hole is to be cut, said automatic coupling means comprising a spring-pressed latch-lever having a hook, an oscillatory fork for holding said latch-lever out of engagement with said holding lever, an endwise movable rock-shaft by which said fork is carried, a torsional and depressing spring co-operating with said rock-shaft, and tripping means for moving said rock-shaft to release said latch-lever when the coupling operation is to be effected.

5. In a button-hole stitching machine, the combination with stitch-forming, work-holding and work-feeding devices, of a button-hole cutting mechanism comprising a cutter-bar and knife or cutter, an operating lever for said cutter-bar, a spring-pressed depending latch-lever at the rear end of said operating lever and provided with a hook, a rotating cam, a lever connected with said cam, so as to be in constant motion when the machine is running, said lever having a pin or projection to be engaged by said hook, an oscillatory fork by which said latch-lever is normally held out of engagement with said pin or projection, and automatic means for tripping said fork to release said latch lever, to couple the latter with the said pin or projection of the constantly moving lever when a button-hole is to be cut.

6. In a button-hole stitching machine, the combination with stitch-forming, work-holding and work-feeding devices, of a button-hole cutting mechanism comprising a cutter-bar and knife or cutter, an operating lever for said cutter bar, a spring-pressed depending latch-lever, at the rear end of said operating lever and provided with a hook, a rotating cam, a lever connected with said cam, so as to be in constant motion when the machine is running, said lever having a pin or projection to be engaged by said hook, an os-

cillatory fork by which said latch-lever is normally held out of engagement with said pin or projection, an endwise movable rock-shaft by which said fork is carried and which rock-shaft is provided with a lower arm, a torsional and depressing spring co-operating with said rock-shaft, and automatic means for tripping said arm to release said latch-lever, to couple the latter with the said pin or projection of the constantly moving lever when a button-hole is to be cut.

In testimony whereof we affix our signatures, in presence of two witnesses.

EDWARD B. ALLEN.
WILLIAM ED. GOODYEAR.

Witnesses:
FRANK A. ITGEN,
HENRY J. MILLER.