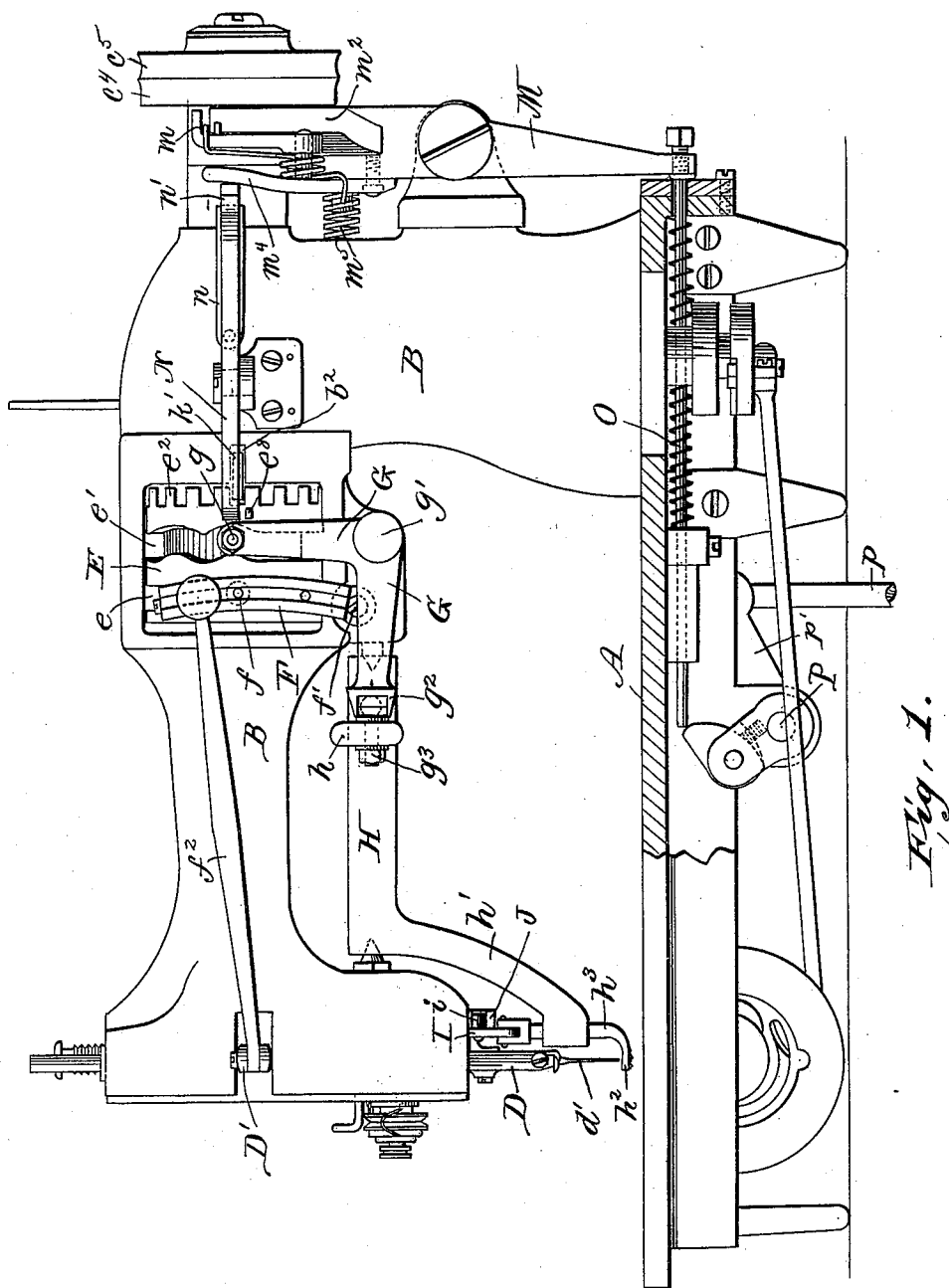


4 Sheets—Sheet 1.

No. 568,338.

Patented Sept. 29, 1896.



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(No Model.)

4 Sheets—Sheet 2.

P. DIEHL & M. HEMLEB.
SEWING MACHINE.

No. 568,338.

Patented Sept. 29, 1896.

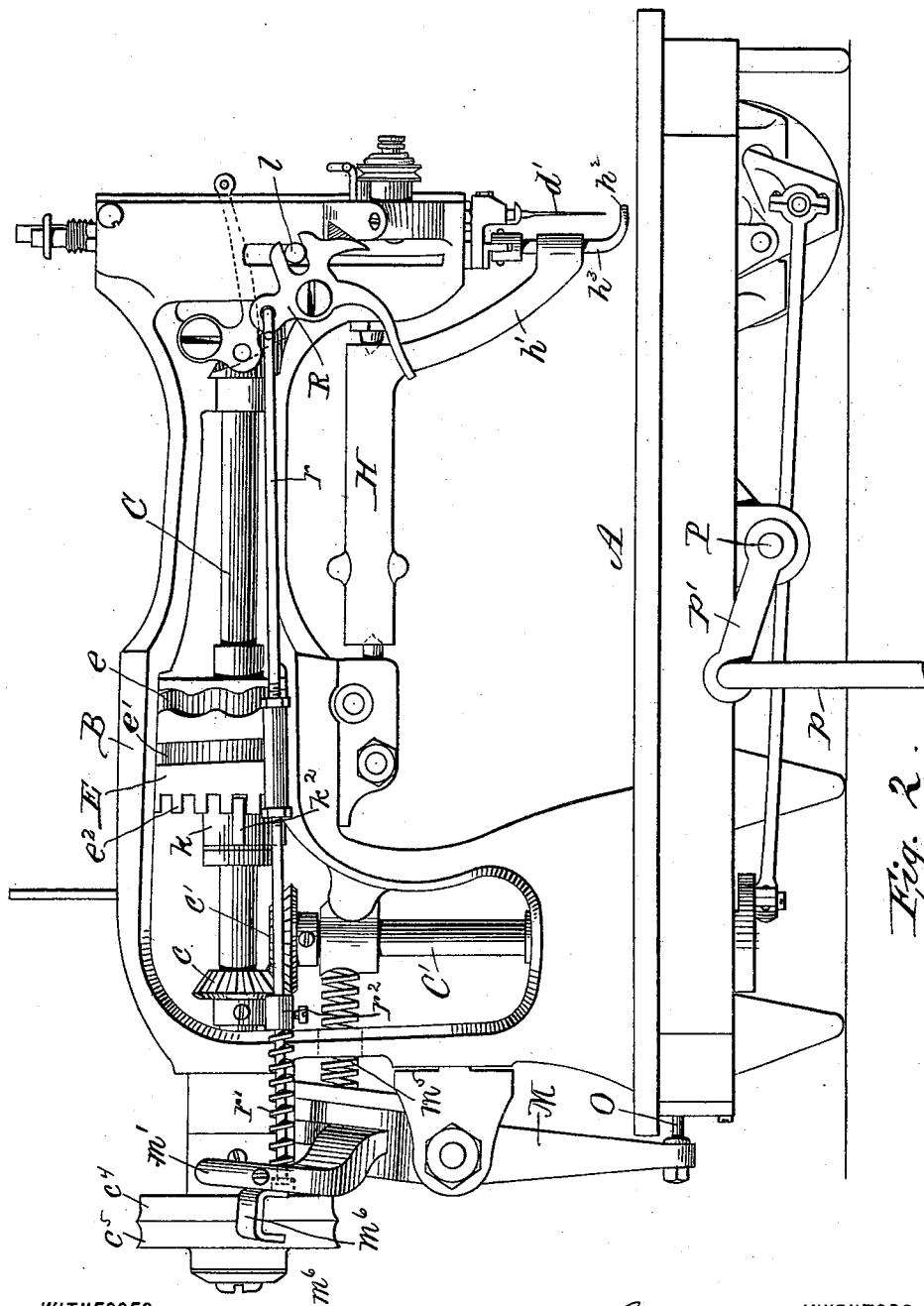


Fig. 2.

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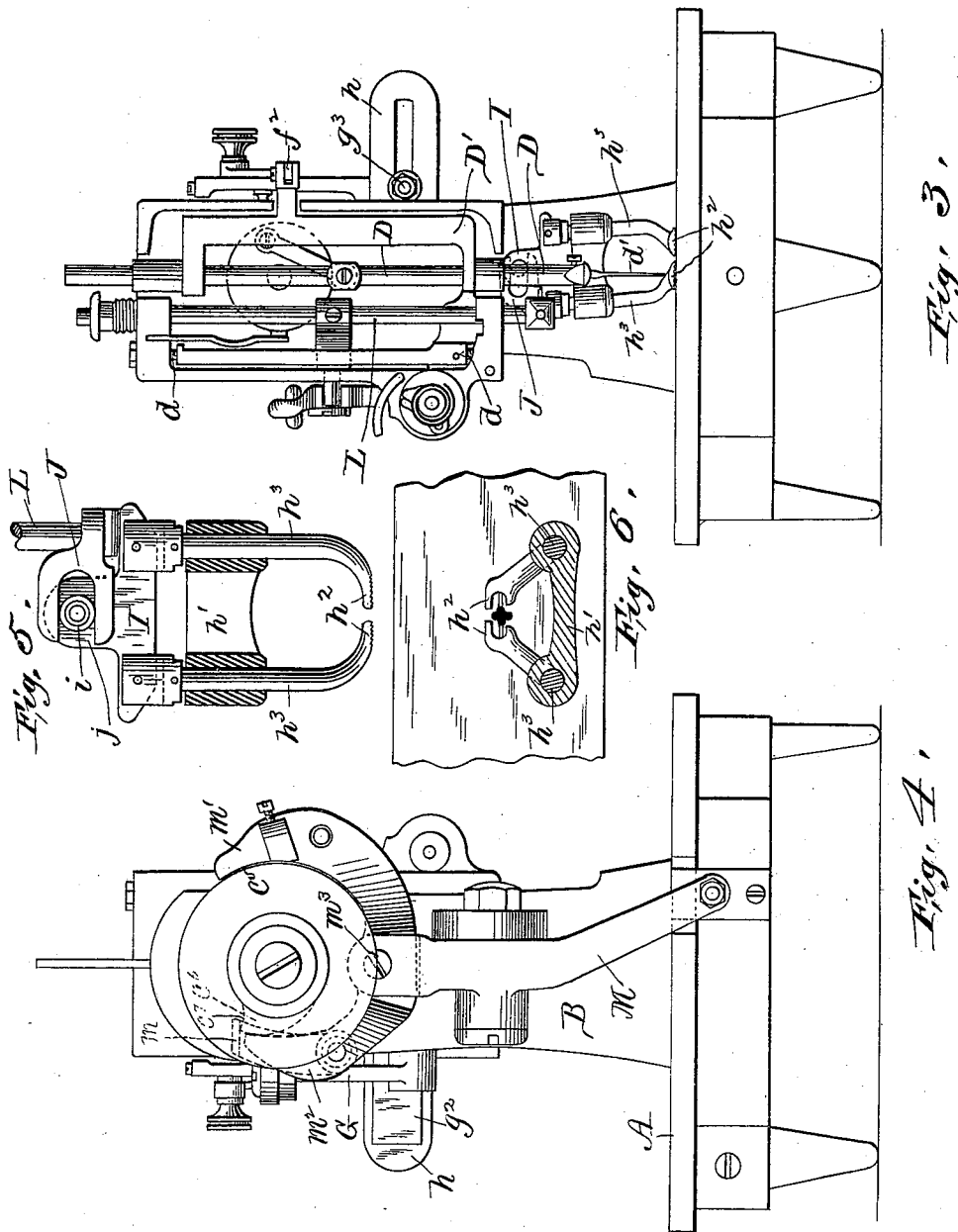
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4 Sheets—Sheet 3.

P. DIEHL & M. HEMLEB.
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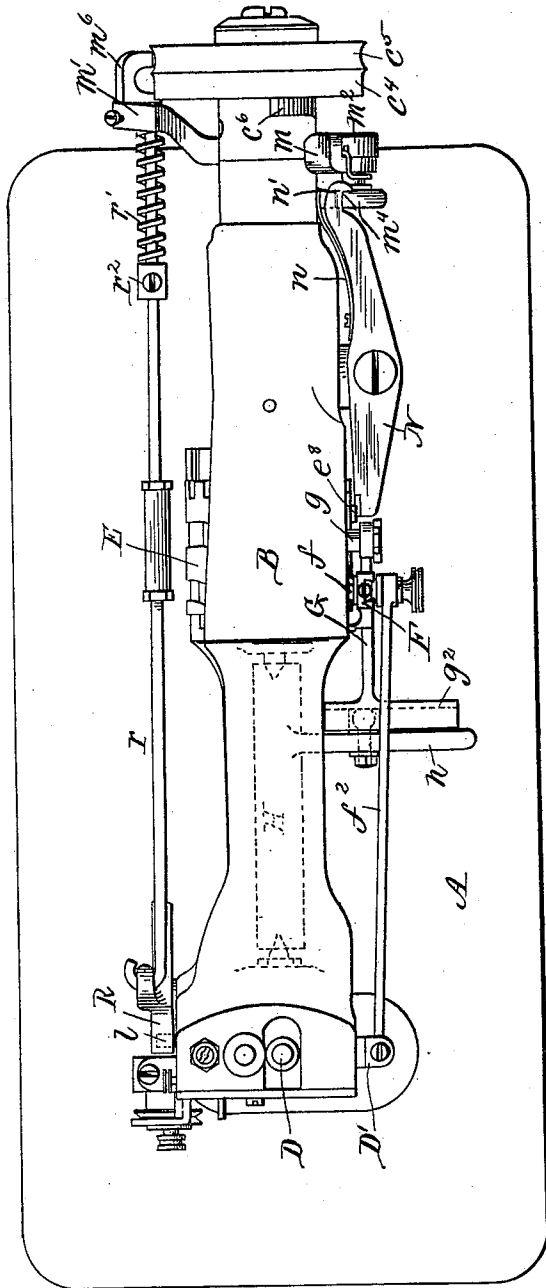
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4 Sheets—Sheet 4.

P. DIEHL & M. HEMLEB.
SEWING MACHINE.

No. 568,338.

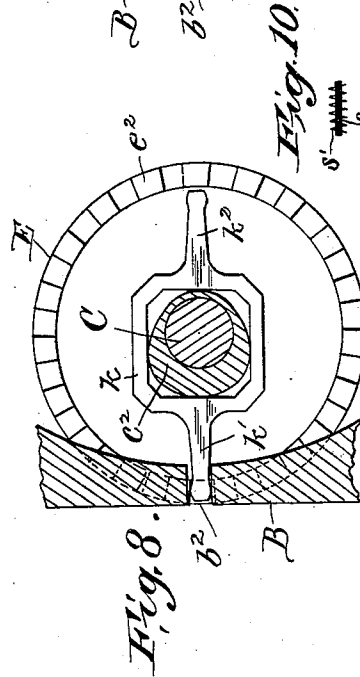
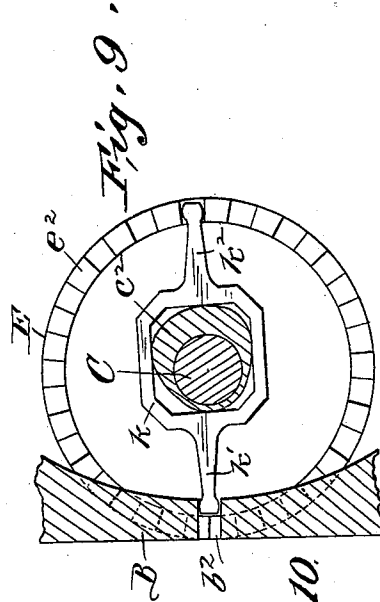
Patented Sept. 29, 1896.



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Fig. 7.



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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 568,338, dated September 29, 1896.

Application filed June 4, 1895. Serial No. 551,626. (No model.)

To all whom it may concern:

Be it known that we, PHILIP DIEHL and MARTIN HEMLEB, citizens 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 Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to that class of sewing-machines for "barring" buttonholes or for forming "tacks" or stays at the ends of pockets or in other places in garments or shoes where special strength is desired to prevent tearing or ripping, and has for its object to provide a machine of the class referred to which will be comparatively simple in construction and which will be efficient and reliable in operation, performing its function with as little noise as possible.

In the accompanying drawings, Figures 1 and 2 are opposite side views of a Singer type of sewing-machine embodying our invention. Figs. 3 and 4 are rear and front end views, respectively, of the same. Figs. 5 and 6 are detail views of the feeders or feeding presser-feet. Fig. 7 is a plan view of our machine. Figs. 8 and 9 are detail views showing the means for intermittently rotating the cam wheel or cylinder from the main or driving shaft. Fig. 10 illustrates a "bar" or tack such as is made by our machine constructed as hereinafter described.

A denotes the work-plate, and B the bracket-arm, of the machine. Journaled in the upper part of the bracket-arm is the main or driving shaft C, connected by bevel-gears c and c' to a vertical shaft C', which operates the shuttle mechanism, as is common in the well-known Singer overseaming-machine, in which the oscillating shuttle works in a plane lengthwise of the machine and in which the needle-bar D reciprocates vertically in a swinging frame D', pivoted on center screws d , so that the needle d' may be reciprocated horizontally to make overseaming or zigzag stitches.

Loosely surrounding the driving-shaft C, so as to rotate independently thereof, is a cam-cylinder E, having cam-grooves e and e' ,

the groove e being entered by a pin or roller-stud f of a lever F, pivoted at its lower end, at f' , to a portion of the arm B, and to said lever F is adjustably attached the rear end of a connecting-rod f^2 , the forward end of which is jointed to the needle-bar frame D'. The cam-groove e' is entered by a pin or roller-stud g , carried by an angular lever G, fulcrumed at g' and having at the forward end of its horizontal arm a grooved cross-head g^2 , connected by an adjustable bolt or pin g^3 with a slotted horizontal arm h of a rock-shaft H, having a depending arm h' to operate one or more feeders or feeding-feet h^2 . Preferably two of these feeders are employed, as herein shown, and they are provided with shanks h^3 , vertically movable in sockets in the lower end of the arm h' and are pivotally connected at their upper ends to a cross-head I, having a roller-stud i , received in a slot j of a bracket J, attached to the presser-bar L, the said cross-head being thus free to rock more or less, so that the feeding-feet h^2 may adjust themselves to uneven material beneath them and thus bear with an equal pressure on such material, so as to perform their function reliably.

The cam-cylinder E is provided with teeth e^2 , engaged by a sliding and vibrating lever-dog, consisting of a yoke k , surrounding a cam c^2 on the driving-shaft C, and two end portions or teeth k' and k^2 . The said lever-dog is held stationary at its end k' by a resistance herein shown as consisting of a slot b^2 in the arm B, into which slot said end at all times extends, so that even when its opposite end k^2 is engaged with the teeth of the cam-cylinder and is swinging to rotate the same said end k' will be held stationary, and when the end k^2 is disengaged from the teeth of the cam-cylinder and is making its return swinging movement the end k' is not only engaged with the teeth of the cam-cylinder, but also with the slot b^2 , so that the said cam-cylinder is locked or held stationary when the feeding end of the lever-dog is disengaged from said cylinder. Thus a positive intermittent rotary movement is imparted to the said cam-cylinder from the continuously-rotating shaft C through the cam c^2 and the lever-dog, and if the direction

of rotation of the shaft be reversed the direction of rotation of the cam-cylinder will also be reversed, and thus these parts will always be kept in proper timing with each other.

5 The cam-groove e has a serpentine portion which imparts a number of vibrations to the lever F to form a desired number of over-
seaming-stitches, and when these have been
10 formed said lever is held stationary by the straight part of said cam-groove. The cam-groove e' has also a serpentine portion to impart a desired number of reciprocations to the feeder or feeders through the lever G and rock-shaft H , the movement of the said feeder
15 or feeders being transversely of the machine or at right angles to the overseaming or horizontal movements of the needle. The serpentine or acting portions of the cam-grooves e and e' are alternated with each other or are
20 so arranged as to operate the levers F and G alternately, the serpentine portion of the cam-groove e' first operating the lever G and rock-shaft H to actuate the feeder or feeders to make a series of long stitches, while the lever
25 F is stationary and the horizontal or overseaming movements of the needle-bar and needle are suspended, and the serpentine portion of the cam-groove e then acting to operate the lever F to move the needle-bar and needle
30 horizontally to form a series of overseaming-stitches across or over the stitches formed by the action of the feeder or feeders, and the machine is then automatically stopped. The cam-groove e' between the ends of its serpentine
35 portion has a slightly-inclined portion, which, during the operation of the machine in forming the overseaming-stitches, slowly feeds the work to space said stitches, and when the last of said stitches has been formed and at
40 the instant just before the machine is stopped the first part of the serpentine portion of the cam-groove e' comes into operation to return the feeder or feeders to their first position.

45 We will now describe the automatic stopping mechanism which is herein shown and which we preferably employ. The driving-shaft C is provided with fast and loose pulleys c^4 c^5 , the former having on its inner side a cam c^6 .

50 M is a stopping-lever having at its upper end a pivoted yoke, the arms m' m^2 of which are slightly offset from each other, so that the arm m' will be opposite the peripheral face of the fast pulley c^4 , while the other arm,
55 m^2 , is opposite the peripheral face of the said cam c^6 on said pulley, and thus when the latter arm is engaged by said cam the former arm will be pressed against the periphery of the said fast pulley to stop the machine, the
60 said yoke having a limited movement on its pivot m^3 to permit of this action.

65 N is a tripping and holding lever or latch, the forward end of which is held by a spring n within the path of movement of a stud or projection e^8 on the cam-cylinder E , said lever or latch having at its rear end a hook n' , which engages an arm or catch m^4 , rigidly at-

tached to or formed integral with the lever M , said latch thus serving to hold said lever in its inoperative position, with its yoke out of
70 contact with the fast pulley c^4 and its cam c^6 ; but when in the rotation of said cam-cylinder said stud or projection engages the forward end of said lever or latch the spring n will be compressed and the hook n' will be disengaged from said arm or catch m^4 and the
75 spring m^5 , pressing against the upper arm of said lever M , will force said arm outward to bring the yoke m' m^2 in position opposite the fast pulley c^4 and cam c^6 to stop the machine,
80 as above described. The arm m^2 of said yoke is preferably provided with a spring-pressed catch m , the upper end of which snaps over the shoulder c^7 of said cam, and thus positively holds the shaft locked against rebound-
85 ing or reaction caused by the sudden stopping thereof.

The arm m' of the yoke is provided with a belt-shipper m^6 , which moves the belt from the fast pulley c^4 to the loose pulley c^5 , or
90 vice versa, when the lever M is operated in stopping or starting the machine.

To start the machine, the operator forces outward a sliding rod O by a treadle-operated rock-shaft P , thus moving the lower end
95 of the stopping-lever M (which is engaged by said rod) outward, and thereby removing the yoke at the upper end of said lever inward away from the fast pulley c^4 and cam c^6 . In
100 thus moving the upper end of the said stopping-lever inward the arm or catch m^4 , which is provided with an inclined or rounded surface, rides over the hook n' of the lever N , so that said hook will now hold the stopping-
105 lever M in its inoperative position until the said lever N is again tripped, as above described.

The presser-bar L is provided with a stud l , engaged by a lever R , connected by a rod
110 r with the stopping-lever M , so that when the said stopping-lever is operated to stop the machine the backward movement of the rod
115 r will lift the presser-bar and thus raise the feeder or feeders h^2 (which also serve as presser-feet) from the work, leaving the latter free to be shifted by the operator for the next operation. The spring r' , interposed
120 between the collar r^2 on the rod r and the lever M , serves to force the presser-bar L and the feeders h^2 downward with a yielding pressure.

In the operation of our machine the work is placed beneath the feeding foot or feet h^2 , and then by pressing down on the treadle
125 (connected by the rod p to the arm p' of the rock-shaft P) the sliding rod O is moved rearward to move the yoke at the upper end of the lever M away from the fast pulley c^4 and to shift the driving-belt from the loose pulley
130 c^5 to said fast pulley and thus set the machine in motion. The cam-groove e' , acting through the lever G and rock-shaft H , now causes the feeder or feeders h^2 to reciprocate the work transversely of the machine to make a series

of long stitches *s*, the threads of which are piled on top of each other, and then the cam-groove *e* comes into operation to move the needle-bar and needle horizontally to make a series of overseaming-stitches *s'* across the stitches *s*. For some forms of tacks it may be desirable to make the overseaming-stitches *s'* in one or two places across the stitches *s*, and, if so, the plain part of the cam-groove *e'* will be formed accordingly; but for barring buttonholes and for cloth work generally it will be preferable to space these stitches as shown in Fig. 10, and to effect this result the serpentine portion of the cam-groove *e'* will have a gentle incline, as shown in Fig. 2, to give a slow-feeding movement to the feeder or feeders *h*², as hereinbefore stated.

We do not wish to be understood as limiting our invention to the details herein shown, as these may be varied widely without departing from the essential features of our invention. Also some parts of our invention may be used without other parts, as will be understood. For example, the stopping mechanism shown and described may be used in connection with buttonhole and other machines which it may be desired to stop automatically when a certain number of stitches have been made.

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

1. In a sewing-machine, the combination with the main shaft thereof, of a stitch-forming mechanism operated from said shaft and comprising a needle-bar and needle and mechanism for moving the same horizontally and for suspending the horizontal movements without arresting the vertical movements thereof, a feeding mechanism for reciprocating the work beneath the needle at right angles to or across the line of the horizontal movements of the latter, an intermittingly-rotating cam loosely mounted on said shaft within the arm of the machine, and an automatic mechanism for stopping the machine when a predetermined number of stitches has been formed.

2. In a sewing-machine, the combination with the main shaft thereof, of a stitch-forming mechanism operated from said shaft and comprising a vertically and horizontally reciprocating needle-bar and needle, an intermittingly-rotating cam loosely mounted on said shaft and within the arm of the machine, connections from said cam to said needle-bar, to move the latter horizontally, and a feeding mechanism, also operated from said cam, for reciprocating the work beneath the needle at right angles to or across the line of the horizontal movements of the latter.

3. In a sewing-machine, the combination with the main shaft thereof, of a stitch-forming mechanism comprising a vertically and horizontally reciprocating needle-bar and needle, a feeding device constructed to move the work beneath the needle at right angles

to the horizontal movements of the latter, and an intermittingly-rotating cam mounted on said shaft and within the arm of the machine and having two alternately-operating serpentine or acting grooves or portions one of which is connected to the said needle-bar to move the latter horizontally and the other of which is connected to said feeding device to cause the latter to reciprocate the work beneath the needle at right angles to or across the line of the horizontal movements of the latter.

4. In a sewing-machine, the combination with the main shaft thereof, of a stitch-forming mechanism operated from said shaft and comprising a vertically and horizontally movable needle-bar and needle, the bell-crank lever *G*, the rock-shaft *H* connected to said lever *G* and having the arms *h* and *h'*, the feeder or feeders operated by said arm *h'*, and an intermittingly-rotating cam, loosely mounted on said shaft within the arm of the machine, for operating said lever *G*.

5. In a sewing-machine, the combination with a stitch-forming mechanism, which includes a horizontally-movable needle-bar and needle, of the lever *G* the horizontal arm of which is provided with the cross-head *g*², the rock-shaft *H* provided with the horizontal arm *h* having an adjustable connection with said cross-head, said rock-shaft having also the depending arm *h'*, one or more feeders operated by said arm *h'*, and a cam for operating the said lever *G*.

6. In a sewing-machine, the combination with the main shaft *C*, of the needle-bar and needle and a complementary stitch-forming device, a horizontally-movable frame in which the said needle-bar reciprocates vertically, the intermittingly-rotating cam-cylinder *E* having cam-grooves *e* and *e'*, the lever *F* connected to said needle-bar frame and operated from said cam-groove *e*, the bell-crank lever *G* operated from said cam-groove *e'*, the rock-shaft *H* having the arms *h* and *h'*, the latter having an adjustable connection with said lever *G*, and one or more feeders, operated by said rock-shaft, to reciprocate the work beneath the needle at right angles to or across the line of the horizontal movements of the latter.

7. The combination with the driving-shaft *C* provided with the cam *c*², of the lever-dog having a yoke surrounding said cam, the cam-cylinder *E* mounted loosely on said shaft and having teeth to be engaged by said lever-dog to positively and intermittingly rotate said cam-cylinder, a horizontally-movable feeding device and a horizontally-movable needle-bar, and connections between said feeding device and needle-bar and said cam-cylinder whereby said feeding device and needle-bar are reciprocated horizontally in planes at right angles to each other, but at different times.

8. In a sewing-machine, the combination with the driving-shaft thereof, of a stitch-forming mechanism operated from said shaft,

- a driving wheel or pulley fast on said shaft, a cam rigidly connected with said shaft, a pivoted spring-pressed stopping-lever provided with a yoke one arm of which is arranged to press against the said wheel or pulley when the other arm is engaged by said cam, and means for holding said stopping-lever inoperative and for tripping the same to throw it into action to stop the machine.
9. In a sewing-machine, the combination with the driving-shaft, of fast and loose pulleys on said shaft, a cam rotating with said fast pulley, a pivoted spring-pressed stopping-lever provided with a yoke one arm of which will be in position to press against said fast pulley when the other arm is engaged by said cam, a belt-shifter movable with said yoke, and means for holding said stopping-lever inoperative and for tripping the same to throw it into action to stop the machine.
10. In a sewing-machine, the combination with the driving-shaft C, of the fast and loose pulleys c^4 and c^5 , the cam c^6 on said fast pulley, the spring-pressed stopping-lever M provided with the arm m^4 and with a pivoted yoke consisting of the arms m' and m^2 , said arms being arranged, respectively, to engage said fast pulley and to be engaged by said cam, the spring-pressed tripping-lever N having a hook to engage said arm m^4 , a rotating device, as stud e^8 , operated from said shaft, to engage said tripping-lever and thus release said stopping-lever so that it will be thrown into action to stop the machine when desired, and a spring-acted catch m arranged to spring over said cam to prevent reaction when the machine is suddenly stopped.

ing a hook to engage said arm m^4 , and a device operated from said shaft, to engage said tripping-lever so that it will be thrown into action to stop the machine when desired.

11. In a sewing-machine, the combination with the driving-shaft C, of the fast and loose pulleys c^4 and c^5 , the cam c^6 on said fast pulley, the spring-pressed stopping-lever M provided with the arm m^4 and with a pivoted yoke consisting of the arms m' and m^2 , said arms being arranged, respectively, to engage said fast pulley and to be engaged by said cam, the spring-pressed tripping-lever N having a hook to engage said arm m^4 , a rotating device, as stud e^8 , operated from said shaft, to engage said tripping-lever and thus release said stopping-lever so that it will be thrown into action to stop the machine when desired, and a spring-acted catch m arranged to spring over said cam to prevent reaction when the machine is suddenly stopped.

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

PHILIP DIEHL.
MARTIN HEMLEB.

Witnesses:
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