

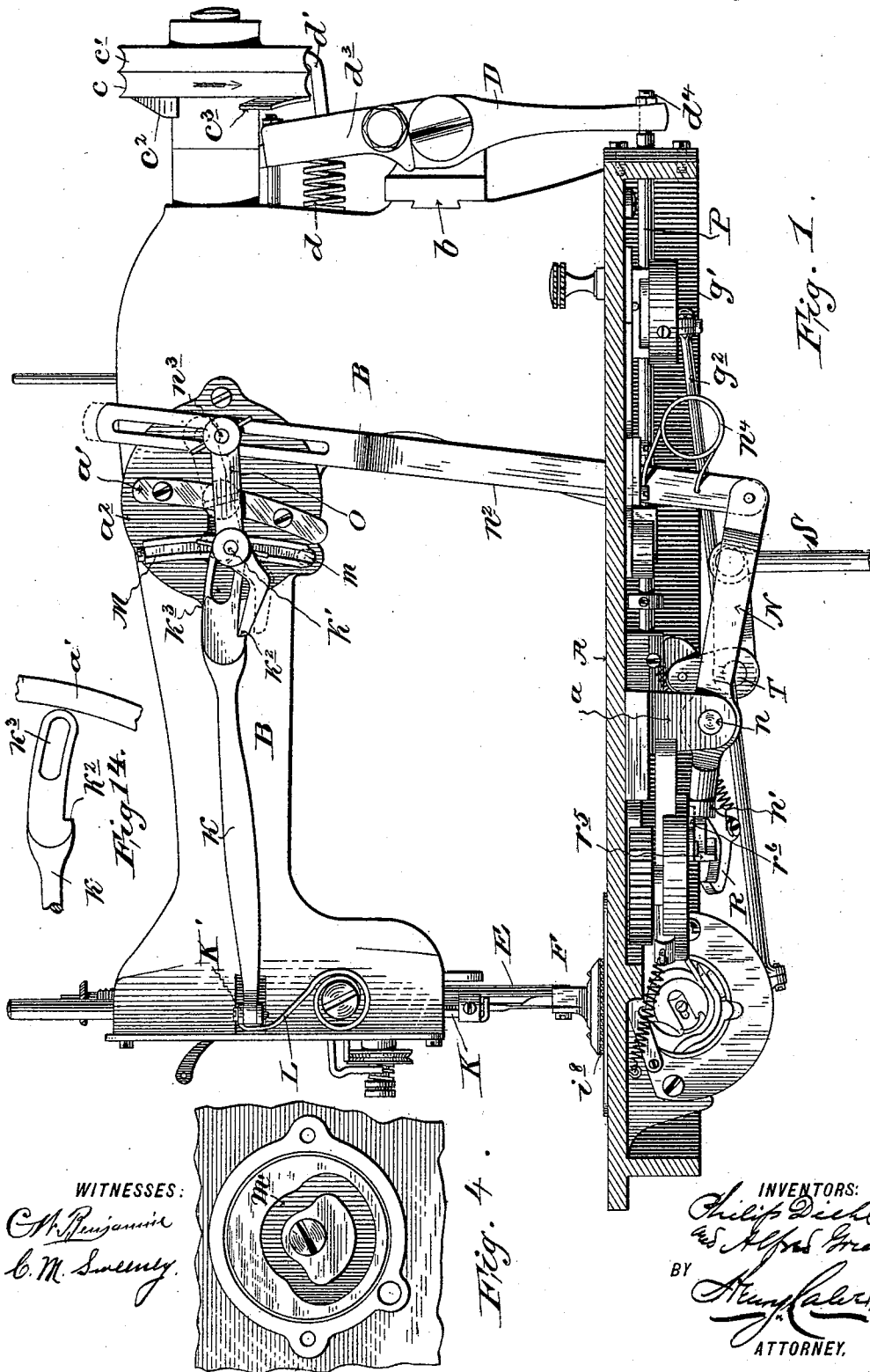
(No Model.)

5 Sheets—Sheet 1.

P. DIEHL & A. GRIEB.
SEWING MACHINE.

No. 538,665.

Patented May 7, 1895.



WITNESSES:
Ch. Benjamin
C. M. Sweeney

INVENTORS:
Philip Diehl
Alfred Grieb
BY
H. M. Sweeney
ATTORNEY.

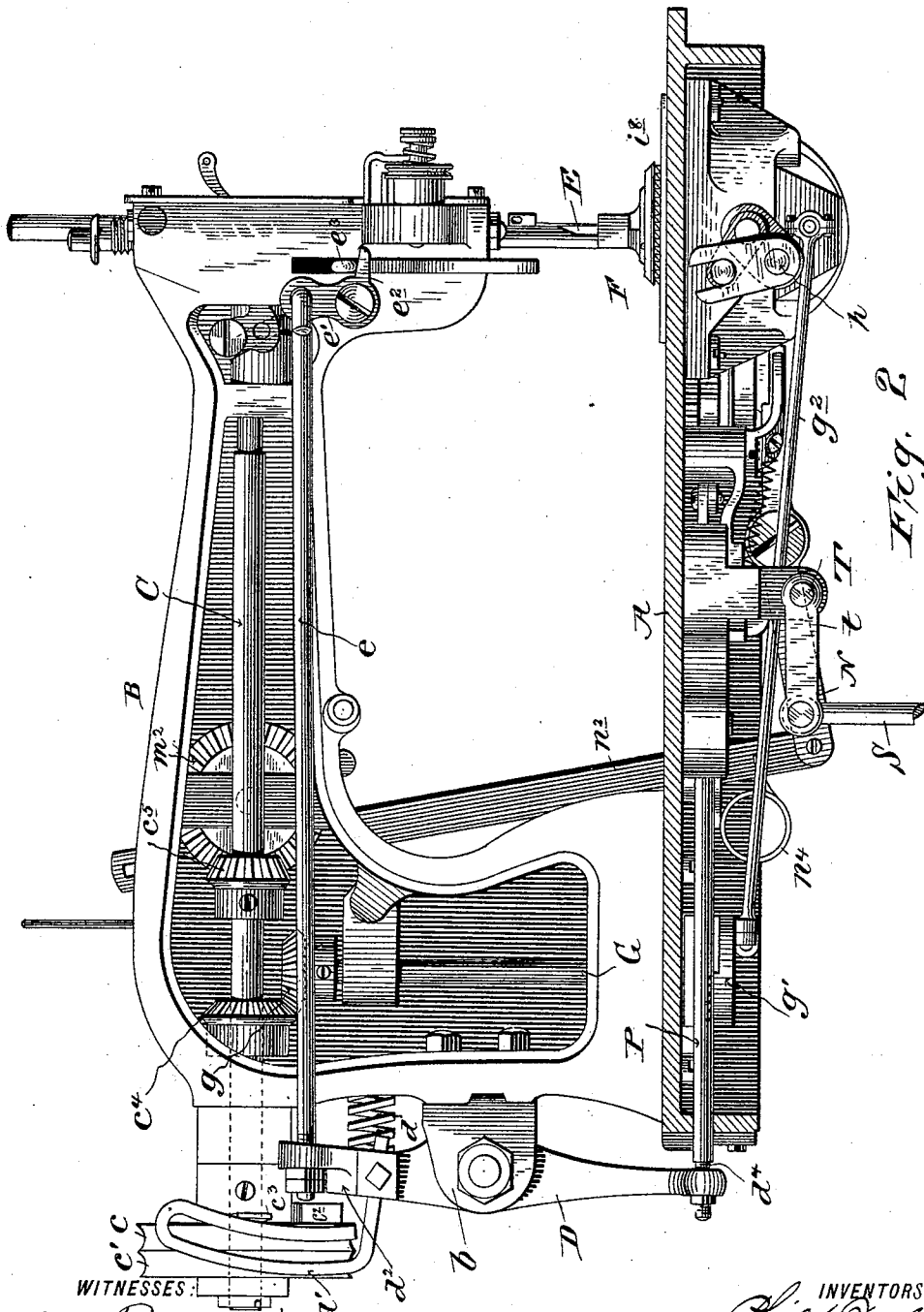
(No Model.)

5 Sheets—Sheet 2.

P. DIEHL & A. GRIEB.
SEWING MACHINE.

No. 538,665.

Patented May 7, 1895.



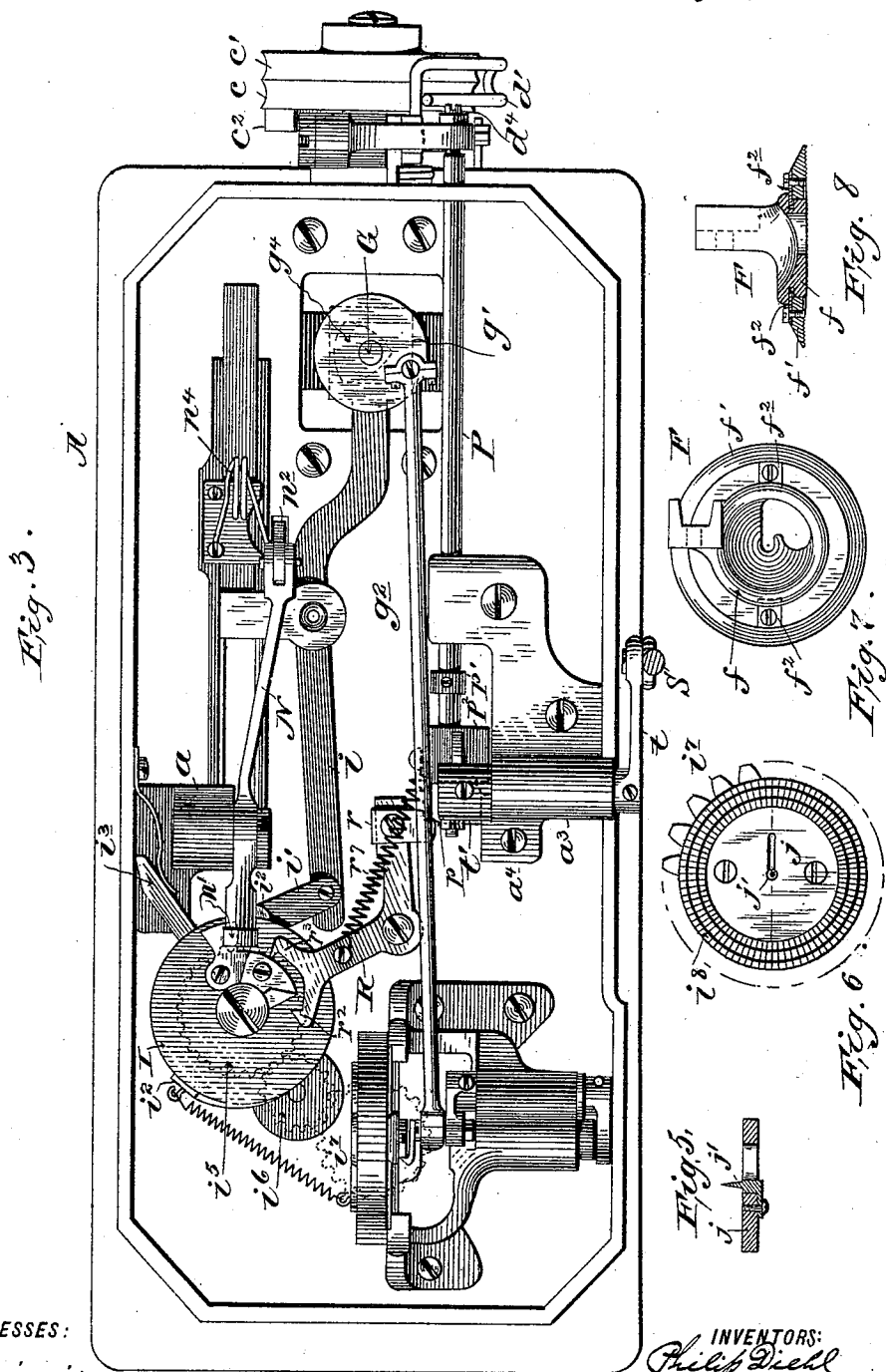
(No Model.)

5 Sheets—Sheet 3.

P. DIEHL & A. GRIEB.
SEWING MACHINE.

No. 538,665.

Patented May 7, 1895.



WITNESSES:

C. W. Benjamin
C. M. Sweeney

INVENTORS:

Philip Diehl
A. Alfred Grieb
BY *Henry K. Lohr*
ATTORNEY,

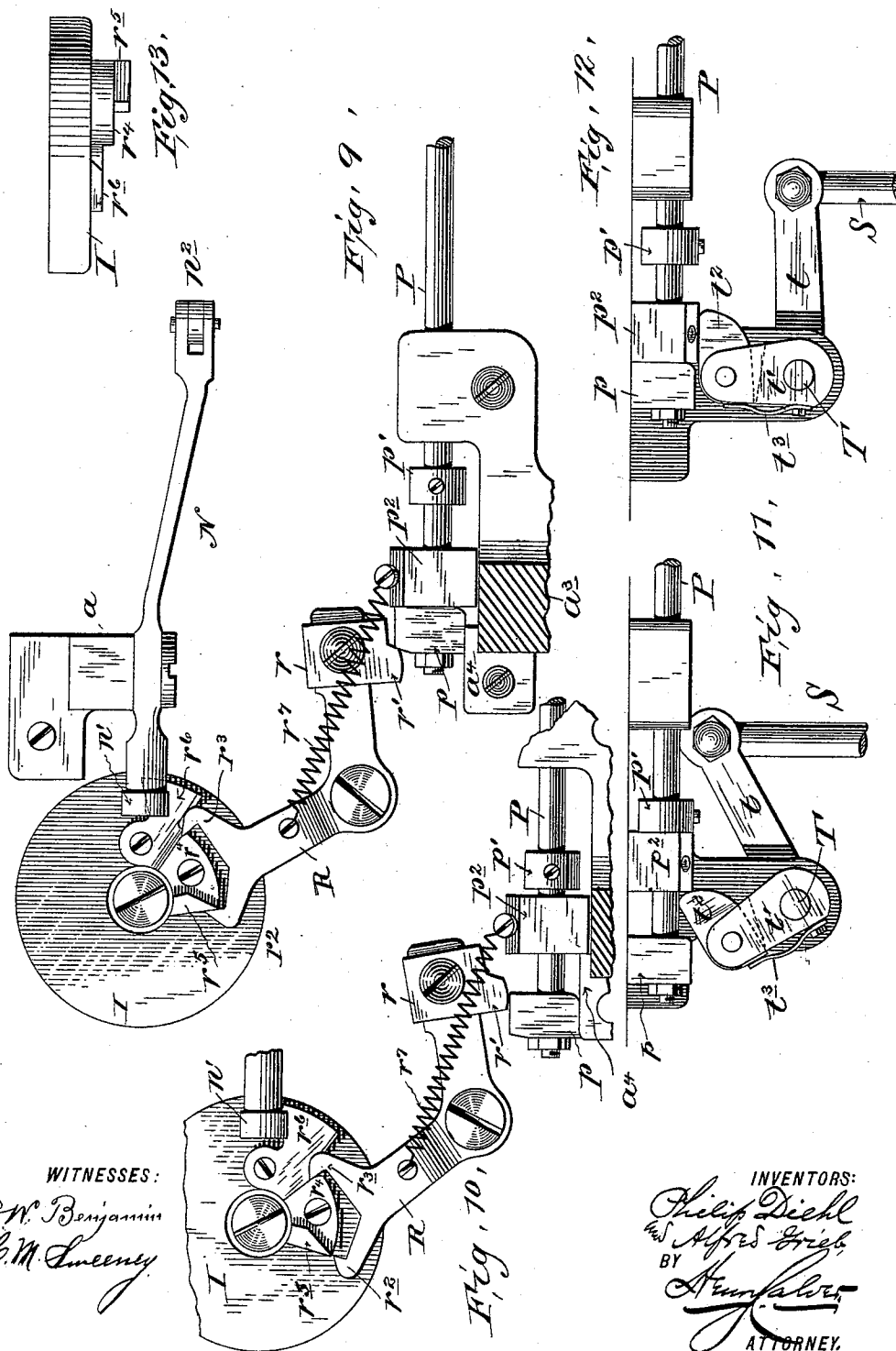
(No Model.)

5 Sheets—Sheet 4.

P. DIEHL & A. GRIEB.
SEWING MACHINE.

No. 538,665.

Patented May 7, 1895.



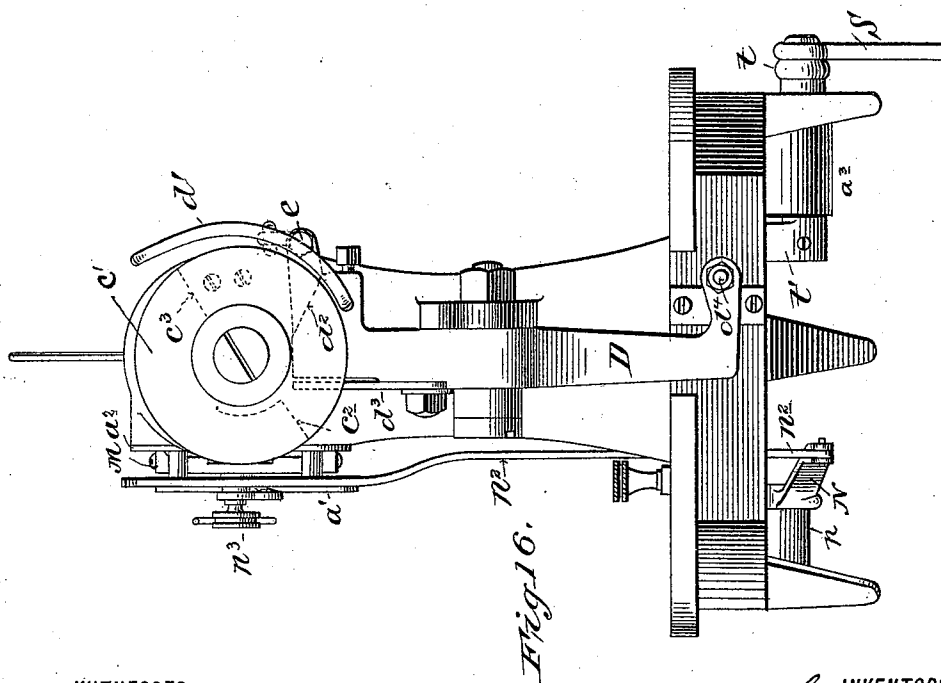
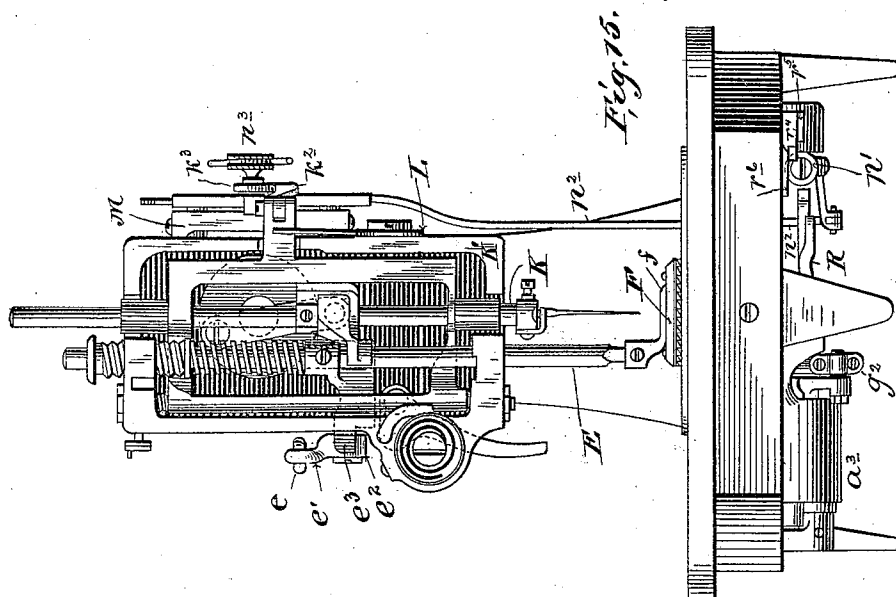
(No Model.)

5 Sheets—Sheet 5.

P. DIEHL & A. GRIEB.
SEWING MACHINE.

No. 538,665.

Patented May 7, 1895.



WITNESSES:

C. W. Benjamin
E. M. Sweeney

INVENTORS:

INVENTORS:
Philip Diehl
Alfred Grieb
BY *Henry Lester*
ATTORNEY.

UNITED STATES PATENT OFFICE.

PHILIP DIEHL AND ALFRED GRIEB, OF ELIZABETH, NEW JERSEY,
ASSIGNORS TO THE SINGER MANUFACTURING COMPANY OF
NEW JERSEY.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 538,665, dated May 7, 1895.

Application filed November 28, 1894. Serial No. 530,206. (No model.)

To all whom it may concern:

Be it known that we, PHILIP DIEHL and ALFRED GRIEB, 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 working eyelets, and has for its object to provide an eyelet-working machine in which, when the circle of eyelet stitches has been completed, the overseaming movement of the needle will be suspended and a few fastening stitches be made and the machine will then be automatically stopped; and simultaneously with this stopping operation, the presser-foot will preferably be automatically lifted for the convenient shifting of the work for the next eyelet. When the work has thus been shifted for the next operation the machine may be again started by means of a treadle-operated device which is of such construction that it will be inoperative between the time when the machine has been started and the completion of the working of the eyelet-hole, so that the starting device cannot accidentally be caused to interfere with the stopping device.

In the accompanying drawings, Figures 1 and 2 are front and rear elevations, respectively, of our improved eyelet-machine, with the work-plate in section. Fig. 3 is a bottom view of the same. Fig. 4 is a detail view of the cam by means of which horizontal movements are imparted to the needle-bar. Fig. 5 is a section of the throat-plate, and Fig. 6 is a plan view of the throat-plate and of the rotary feeding ring or dog surrounding the same. Figs. 7 and 8 are plan and sectional views, respectively, of the presser-foot. Figs. 9 and 10 are detail views showing parts of the mechanism for suspending the horizontal movements of the needle-bar and of the stopping mechanism, and Figs. 11 and 12 are detail views of a part of the stopping and starting mechanism. Fig. 13 is a detail side view of the clutch-wheel. Fig. 14 is a detail view of a part of the needle-bar mechanism. Fig. 15 is a front end

view of our machine with the face-plate removed, and Fig. 16 a rear end view of our machine.

A denotes the work-plate and B the bracket arm of the machine. Journaled in the upper part of the arm B is the driving shaft C provided at its rear end with a fast pulley *c* and a loose pulley *c'*.

D is a stopping and starting lever pivotally mounted in a bracket *b* secured to the vertical part of the arm B, said lever having its upper end pressed outward by a spring *d* interposed between said lever and said arm. To the lever D is attached a belt shifter *d'* to move the driving belt from the fast pulley to the loose pulley, and vice versa. The fast pulley *c* is provided with a block or projection *c²* to engage the lever D when the upper end of the latter is moved into the path of said block or projection, a retarding spring *c³* secured to said pulley *c* and so arranged as to wipe against the outer face of the upper end of said lever serving to check the rotary movement of the driving shaft somewhat before it is finally stopped by the impact of the block or projection *c²* with said lever. Said spring *c³* also serves, by engagement with a shoulder *d²* on said lever D, to prevent back-motion of the pulley *c* and driving shaft when they have been suddenly stopped. To still further lessen the jar or shock in stopping, the lever D is preferably provided with a stiff plate-spring *d³* against which the block or projection *c²* comes in contact in stopping, instead of impinging directly against the lever D, said spring *d³* thus serving as a cushioning device.

The upper end of the stopping lever D is connected by a rod *e* to a bell-crank lever *e'* pivoted on the screw *e²* attached to the head of the machine and having a short arm or toe *e²* which is arranged beneath a lug or projection *e³* on a bracket attached to the presser-bar E, so that said bar and the presser-foot F carried thereby will be automatically lifted when the upper end of the lever D moves outward to stop the machine.

The driving shaft C is connected by bevel gears *c⁴* and *g* to a vertical shaft G having at its lower end a crank disk *g'* connected by a pitman *g²* to a shuttle-driving rock-shaft *h* as

is common in the well-known "Singer" over-seaming machine, and above said crank-disk on said shaft G is a cam g^4 working in a yoke at the rear end of a feed-operating lever i , the forward end of which is connected by a link i' to a clutch lever i^2 serving to impart an intermittent rotary movement to the clutch-wheel I by a construction common in feed wheels of sewing machines, and which therefore need not be herein more fully shown and described, the backward movements of said clutch wheel being prevented by a clutch-pawl i^3 operating in the usual manner.

Connected to the clutch-wheel I, to rotate therewith is a gear-wheel i^5 which is connected by an intermediate gear i^6 to a gear i^7 connected to or formed integral with a rotary feeding ring or dog i^8 surrounding the throat-plate j , the latter being provided with a needle slot and with a pin j' at one end of said slot, said pin serving as a pivot on which the goods will turn in working an eyelet. The presser-foot F consists of a central hub portion f surrounded by a ring f' adapted to rotate with the feeding ring or dog i^8 , said ring f' being attached to said hub f by small plates f^2 the inner ends of which engage an annular groove in said hub.

The needle bar K, which is reciprocated vertically by a pitman connected to a crank at the forward end of the driving shaft C, is mounted in a horizontally swinging frame K', connected by a pitman k to a pin k' engaging a lever M pivoted at m and operated by a grooved cam m' actuated by a bevel gear m^2 meshing with a smaller bevel gear c^5 of the shaft C, the proportion of these bevel gears being such that the said cam makes one revolution to two revolutions of the said shaft C, this construction of parts, for moving the needle-bar horizontally, being the same as in the Singer overseaming and button-hole machines.

The gear i^5 is provided with a few more teeth than the gear i^7 so that the feeding ring or dog i^8 will have made a complete revolution before the clutch wheel I, and when the circle of overseaming stitches has been completed to form the eyelet it is desirable, before the machine is automatically stopped, that the horizontal or overseaming movements of the needle bar and needle should be suspended and a few fastening stitches be made at the periphery of the eyelet. To suspend the horizontal movements of the needle-bar and needle, for the purpose of making the fastening stitches referred to, we provide a novel mechanism which will now be described.

N is a lever pivoted at n to a bracket a depending from the work-plate A, said lever having at its forward end a roller n' and being jointed at its rear end to a vertical bar n^2 connected by a pin n^3 to the rear end of a lever O pivoted on the pin k' and having its forward end arranged to engage a shoulder k^2 of the pitman k , said pitman having a slot k^3 in which the said pin k can reciprocate

idly when the lever O is moved to the position denoted by dotted lines in Fig. 1 to disengage the forward end of the said lever I from the said shoulder k^2 of the pitman k . The clutch-wheel I has a projection or cam i^5 which, when a circle of overseaming stitches, required to form an eyelet, has been completed, comes into engagement with the roller n' of the lever N and thus raises the rear end of said lever to lift the bar n^2 and thereby move the lever O out of engagement with the pitman k , and the spring L will then hold the said pitman in its rearward position with its rear end against the stop bar a' on the cover-plate a^2 ; the pin k' , operated by the lever M, now working idly in the slot k^3 as above stated, and the horizontal movements of the needle-bar and needle being thus suspended.

When the machine is in operation the stopping lever D is in the position shown in Figs. 1 and 2, with the belt shifter d' in proper position to hold the belt on the fast pulley c , said lever being retained in this position by a rod P which is in contact with an adjustable screw or abutment d^4 with which the lower end of said lever is preferably provided. Rigidly secured to the forward end of the rod P is a block p which, when the machine is running, is engaged by a block r of a holding lever R, the toe-piece r' of the said block r having its face slightly rounded or cam-shaped, as clearly shown in Figs. 9 and 10, and said lever having at its opposite end the fingers r^2 , r^3 . The clutch-disk I is provided with a block r^4 having a tripping lug r^5 which, when the fastening stitches above referred to have been made, engages the finger r^3 of the lever R and moves said lever so as to disengage the toe-piece r' from the block p , and when the said finger is thus disengaged from said block the rod P will, by the stress of the spring d acting on the stopping lever D, be moved from the position shown in Fig. 9 to the position shown in Fig. 10 as said lever is moved by said spring to shift the belt from the fast to the loose pulley and to bring the upper end of said stopping lever into the path of the block or projection c^2 on the fast pulley c . As the rod P is thus shifted from the position shown in Fig. 9 to that shown in Fig. 10 the block p carried by said rod wipes along the rounded or cam-shaped face of the toe-piece r' of the block r , thus moving the lever R by which said block r is carried, so as to disengage the finger r^2 from the tripping lug r^5 and at the same time and by the same movement of the said lever R cause the finger r^3 thereof to engage the rear face of the block r^4 and move the clutch-wheel I forward slightly so as to shift the projection or cam i^5 on said clutch-wheel out of holding engagement with the roller n' of the lever N and thus permit said lever, the bar n^2 and lever O to assume their normal positions under the stress of the spring n^4 , so that when the machine is again started the horizontal or overseaming movements of the needle-bar and needle will be resumed.

Furthermore, this slight forward movement of the clutch-wheel I by the finger r^3 of the holding lever R brings the tripping lug r^5 far enough forward, so that when said lever is again to be restored to its holding position when the machine is next to be started, the finger r^3 of said lever can pass behind the said tripping lug.

The machine is started by means of a treadle-operated rod S connected to an arm t of a short shaft T journaled in a bracket a^3 depending from the work-plate A and having a second arm t' carrying a pivoted toe-piece or part t^2 against which bears a spring t^3 also carried by said arm t' . The rod P is provided with a fixed collar p' ; and loosely mounted on said rod is a block p^2 to which is connected one end of a spring r^7 , the other end of which is attached to the lever R; said spring thus having a tendency to hold said lever in the position shown in Fig. 9 and to force the block p^2 toward the block p . To limit the forward movement of the block p^2 under the stress of the spring r^7 we provide a fixed abutment a^4 formed as part of the bracket a^3 , and when the toe-piece r' of the block r carried by the holding lever R, and the block p and rod P are moved to the position shown in Figs. 10 and 11, said abutment will arrest the forward movement of the said block p^2 so as to leave an opening between the latter and the block r for the entrance of the toe-piece t^2 which can thus become engaged with the block p^2 , as shown in Fig. 11, when the treadle-rod S is lifted. In thus lifting the treadle-rod to engage the toe-piece t^2 with the block p^2 the spring t^3 will yield to permit said toe-piece to turn slightly on its pivot in passing the said block, said spring then restoring said toe-piece to the engaging position shown in Fig. 11. To start the machine the operator now depresses the treadle-rod forcing the rod P rearward and thus moving the stopping and starting lever D to the position shown in Figs. 1 and 2, to withdraw its upper end from engagement with the projection or block c^2 of the fast pulley c and at the same time to shift the driving belt from the loose to the said fast pulley. When the rod P is thus restored to the position shown in Fig. 9 the toe-piece r' of the block r is forced into engagement with the block p on said rod to retain the latter in place, and when the parts have been thus restored to working position a slight further downward movement of the treadle-rod disengages the toe-piece t^2 from the front or vertical face of the sliding block p^2 so that the latter, under the stress of the spring r^7 , will now be moved forward against the block p , thus closing the opening between them. The parts will now be in the position shown in Fig. 12, and until the machine is again stopped, so that the blocks p and p^2 are separated from each other, to make an opening for the entrance of the toe-piece t^2 , it will be impossible for the operator, by any movement of the treadle-rod, to engage the said toe-piece

t^2 with the said block p^2 , and thus any accidental or involuntary movement of the treadle rod by the operator will not effect such a displacement of the parts as will interfere with the operation of the stopping mechanism at the proper time.

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

1. In an eyelet-working sewing machine, the combination with a rotary, toothed or serrated feeding ring which directly engages the material to be rotated, of a stitch-forming mechanism comprising a needle-bar and means for imparting horizontal and vertical movements thereto, and connections between said feeding ring and the mechanism for moving the needle-bar horizontally whereby the horizontal movements of the needle-bar are automatically suspended, but without stopping the vertical movements thereof.

2. In an eyelet-working sewing machine, the combination with a circular rotary feeding ring, of a stitch-forming mechanism comprising a needle-bar and means for imparting horizontal movements thereto, connections between said feeding ring and the mechanism for moving the needle-bar horizontally whereby the horizontal movements of the needle-bar are automatically suspended, and an automatic stop-motion mechanism which is thrown into operation to stop the machine after the horizontal movements of the needle-bar have ceased.

3. In an eyelet-working sewing machine, the combination with a rotary horizontally placed feeding ring or dog and a gear-wheel for operating the same, of an operating gear-wheel connected to and having a greater number of teeth than the first-named gear wheel, so that a complete revolution may be given to said feeding ring or dog with less than a complete revolution of said operating gear-wheel, to afford time for the production of fastening stitches before the said operating gear-wheel has completed a revolution.

4. In an eyelet-working sewing machine, the combination with a stitch-forming mechanism comprising a horizontally movable needle-bar, of a swinging frame in which said bar is mounted, a cam, a lever operated by said cam, the pitman k connecting said lever and frame and provided with the shoulder k^2 and the slot k^3 , the lever O, the bar n^2 , the lever N, a circular feeding ring or dog, and a wheel, as I, having a geared connection with said feeding ring or dog and having a cam or projection to engage a part of said lever N to suspend the horizontal movements of said needle-bar.

5. In an eyelet working sewing machine, the combination with a rotary, toothed or serrated feeding dog or ring, which directly engages the material to be rotated and which is fitted to be turned entirely around in a complete circle, of a wheel, as I, having a geared connection with said dog or ring, a stop-motion device, and connections between the lat-

ter and said wheel whereby said device may be operated to stop the machine.

6. In an eyelet working sewing machine, the combination with a rotary feeding dog or ring, of a wheel, as I, having a gearing connection with said dog or ring and provided with a tripping lug or projection, the stopping lever D, its spring d , the rod P having the block p , and the holding lever R having the finger r^2 and the block r having the toe-piece r' .

7. In an eyelet-working sewing machine, the combination with a rotary feeding dog or ring, of the clutch-wheel I geared thereto and provided with a block r^4 and a tripping lug or projection r^5 , the stopping lever R having the fingers r^2, r^3 and the block r having the toe-piece r' with a rounded or cam edge, the stopping lever D, its spring d and the rod P having the block p to be engaged by said toe-piece.

8. The combination with the stopping lever and its spring, of the rod P provided with the fixed block p , the fixed collar p' and the loose block p^2 , a spring connected to said loose

block, and an abutment or stop to limit the movement of the latter under the action of said spring, the holding lever R having the block r with the toe-piece r' , the shaft T having the arms t and t' , the latter provided with the spring-pressed toe-piece t^2 , and a treadle operated rod connected to said arm t .

9. In an eyelet working sewing machine, the combination with a horizontally rotating feeding dog or ring, of a presser bar, a presser foot carried by said bar and provided with a ring adapted to rotate with the said feeding dog or ring, an automatic stop motion mechanism, a presser foot lifting device and connections between said mechanism and device whereby the presser foot is lifted when the machine is automatically stopped.

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

PHILIP DIEHL.
ALFRED GRIEB.

Witnesses:

J. G. GREENE,
J. F. JAQUITH.