No. 837,668. PATENTED DEC. 4, 1906.

A. H. DE VOE.

RUFFLING AND SEWING MACHINE.

APPLICATION FILED JUNE 5, 1905.

5 SHEETS—SHEET 1.

Fig. 1.

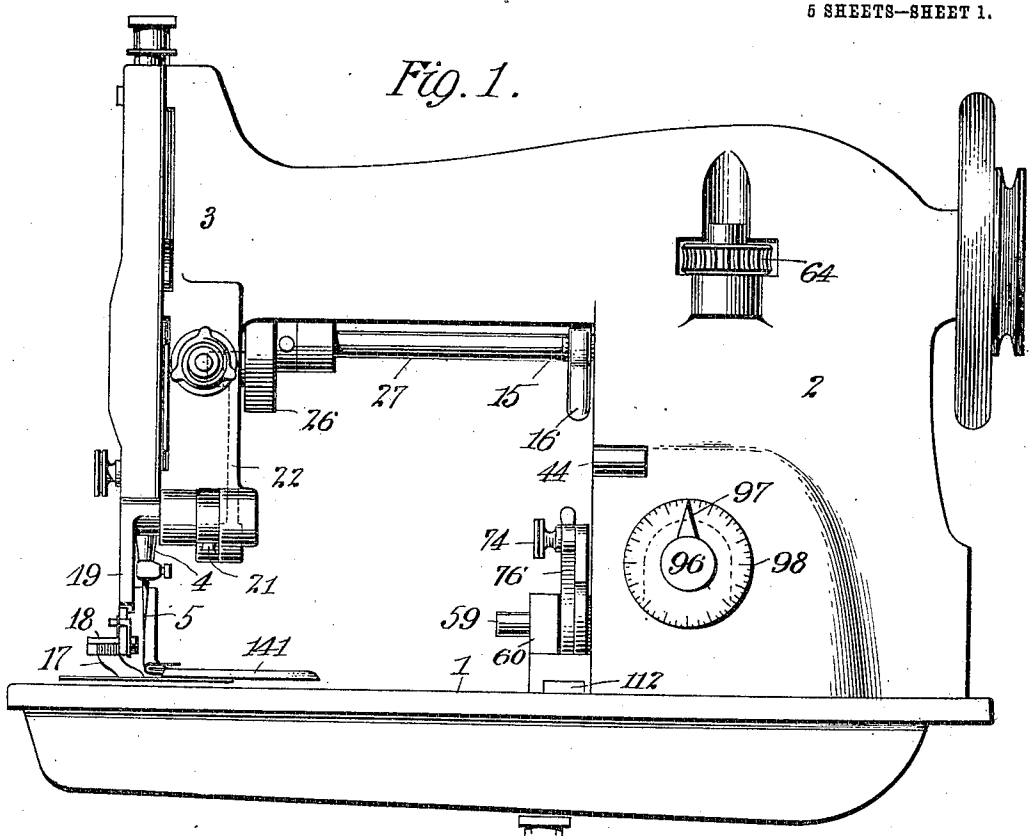
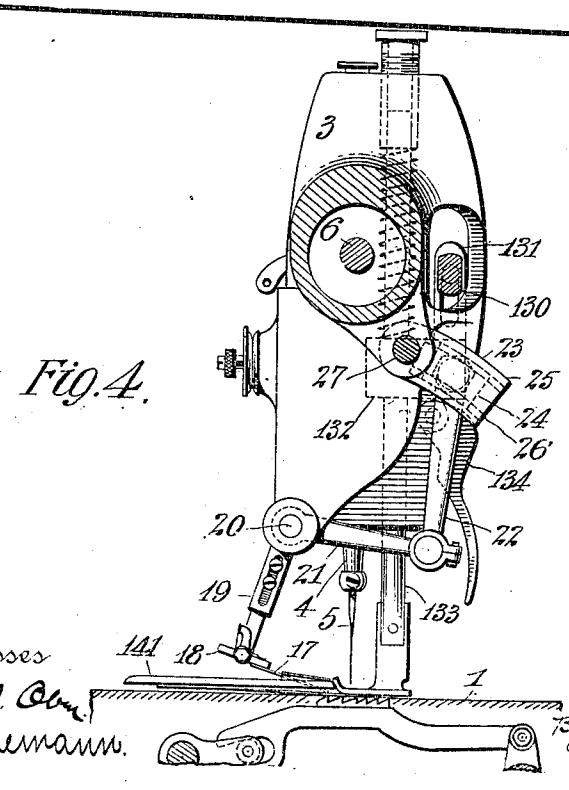



Fig. 4.

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6 SHEETS—SHEET 2.

Fig. 2.

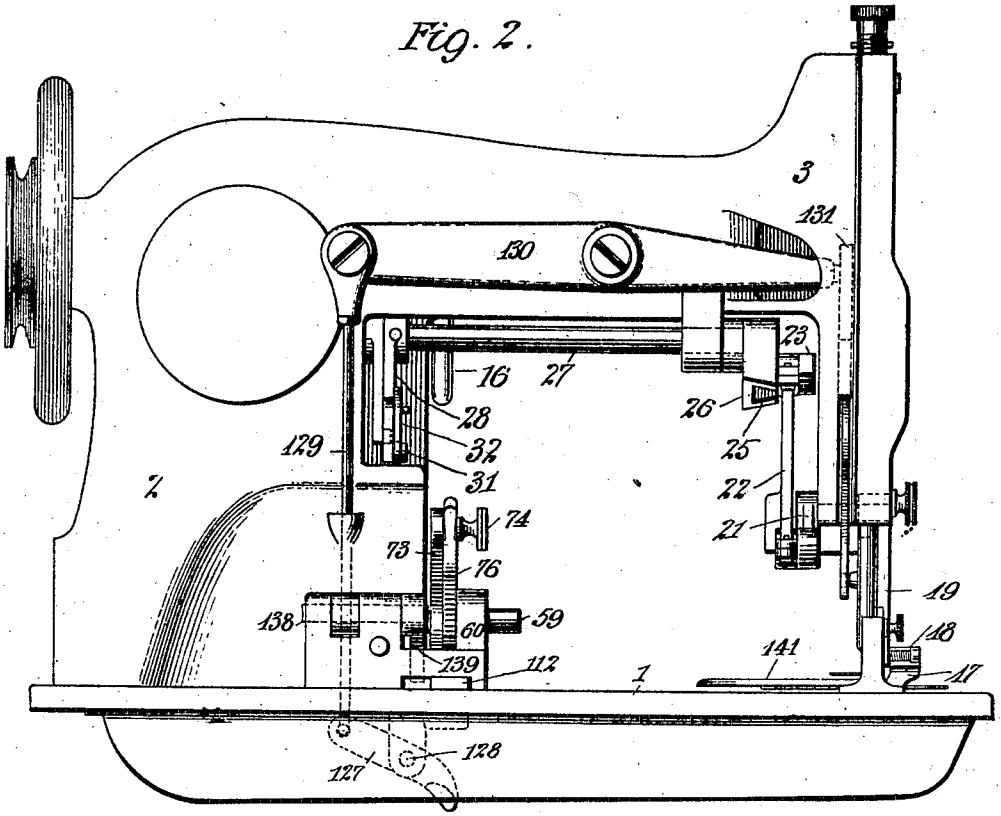
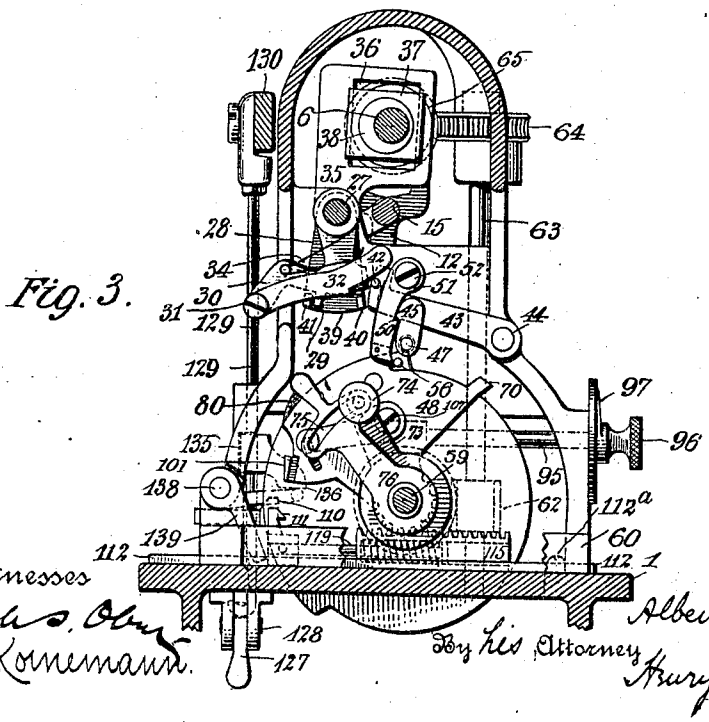



Fig. 3.

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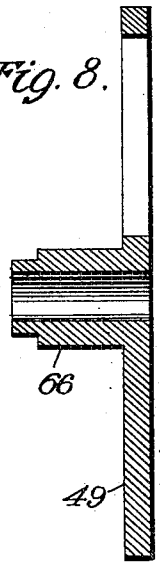
6 SHEETS—SHEET 3.

Fig. 8.



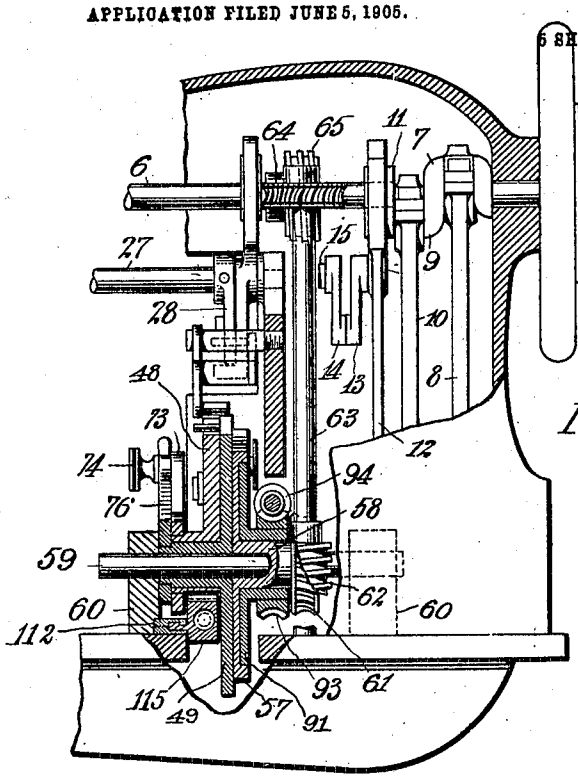




Fig. 5.

Fig. 7.

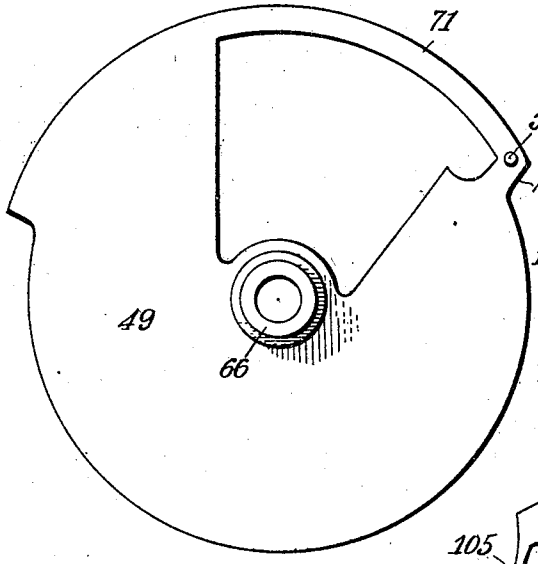
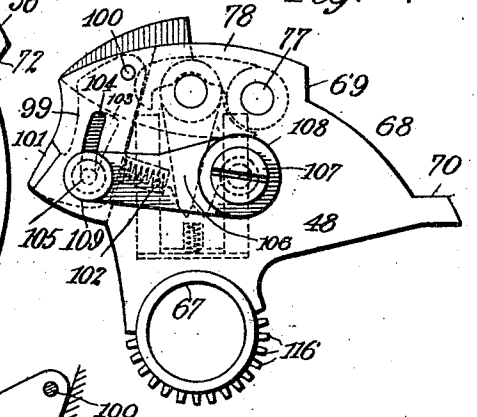



Fig. 6.



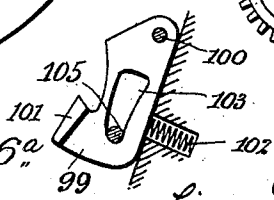




Fig. 6a.

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5 SHEETS—SHEET 4.

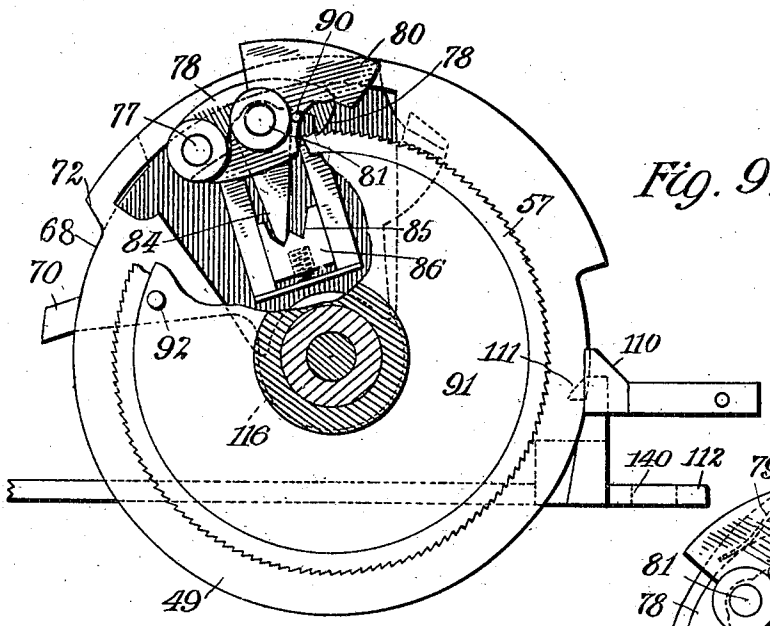


Fig. 9.

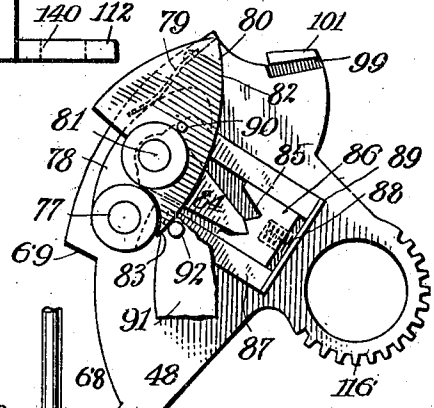


Fig. 11.

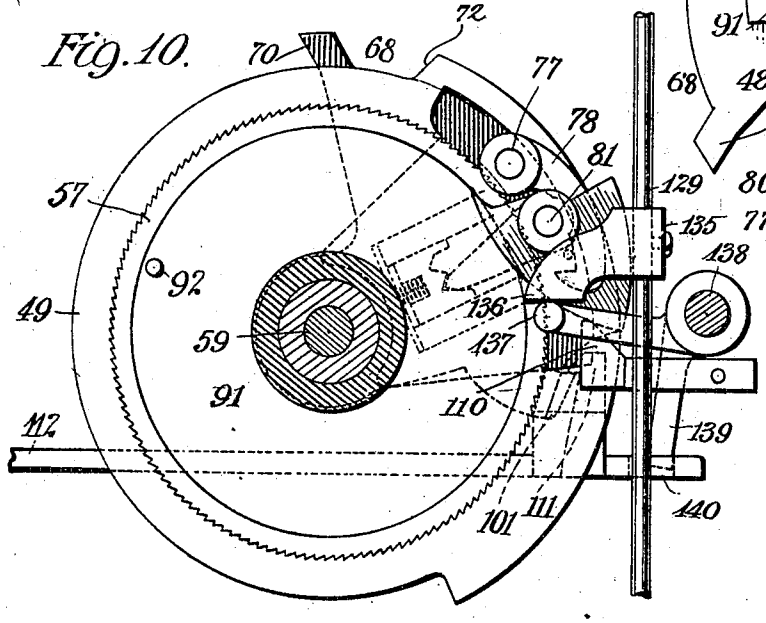


Fig. 10.

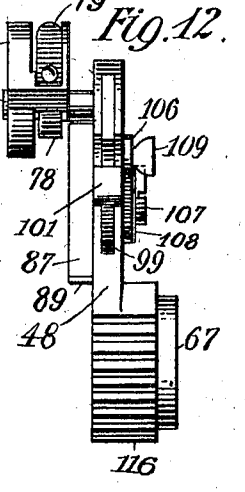


Fig. 12.

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6 SHEETS—SHEET 6.

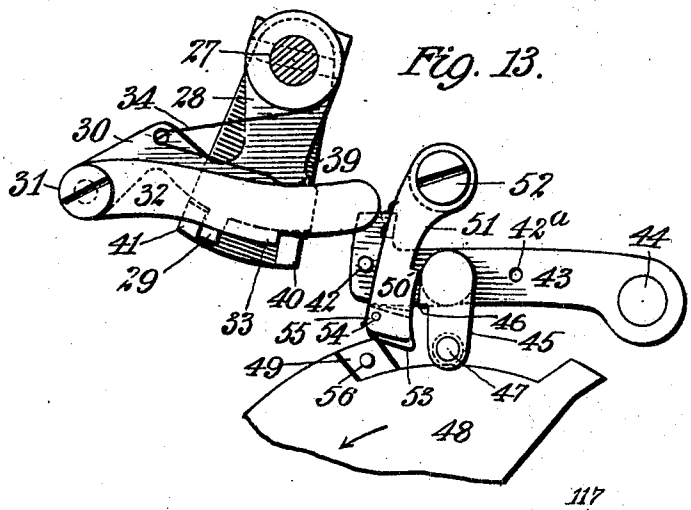


Fig. 13.

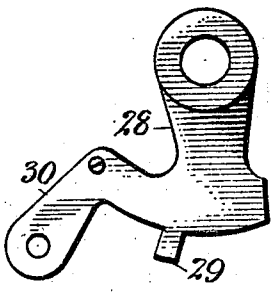


Fig. 14.

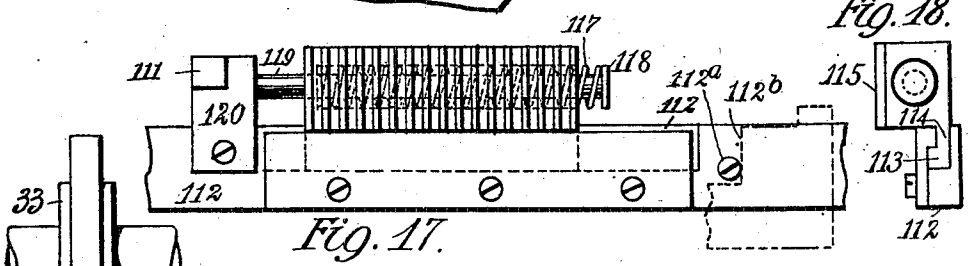


Fig. 17.

Fig. 18.




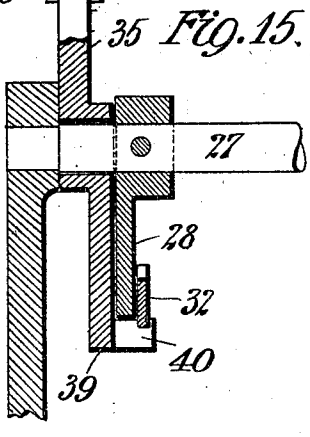


Fig. 15.

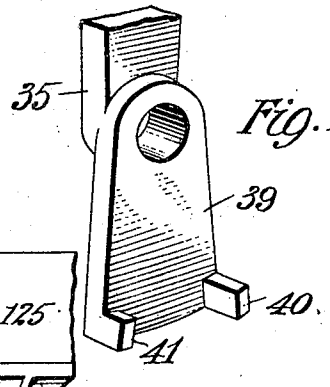


Fig. 16.

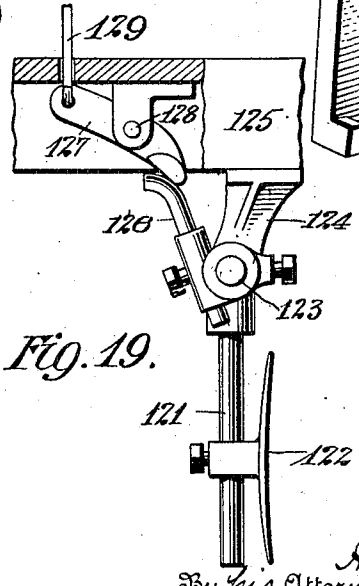


Fig. 19.

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# UNITED STATES PATENT OFFICE.

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## RUFFLING AND SEWING MACHINE.

No. 837,668. Specification of Letters Patent. Patented Dec. 4, 1906.

Application filed June 5, 1905. Serial No. 263,740.

*To all whom it may concern:*

Be it known that I, ALBERT HARRISON DE VOE, 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 Ruffling and Sewing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in that class of ruffling and stitching machines in which the action of the ruffling device is designed to continue during a portion only of the stitching of a seam, being thrown into and out of action while the stitch-forming devices are in operation.

This class of machines is designed particularly for use in stitching together two or more of the members of a garment, such as the component members of the yoke and the body of a shirt, all in a single operation, the body of the garment being ruffled or gathered in one or more places in the course of the stitching operation.

Heretofore it has been proposed to provide the ruffling device with means constantly under the control of the operator for throwing it into and out of operation while the stitching proceeds; but with such a machine the amount and position of the fullness formed in the gathered member of the garment depends entirely upon the skill of the operator.

It is the object of the present improvement to provide a machine of the general character described which is capable of adjustment prior to the stitching operation in such manner that the position of the gathered portion of the goods in the seam may be automatically determined for each stitching operation, while the machine is capable of use in ordinary stitching independently of the ruffling device, which may be maintained out of action for an indefinite period when desired.

In the preferred embodiment of the present invention the ruffling device comprises a ruffling-blade carried by a reciprocating part of a train of mechanism of any usual or suitable character which is adapted to be operated by means of a suitable actuator permanently connected with the stitch-forming mechanism through the main shaft of the machine, and therefore operable continuously throughout the period of action of the stitch-forming mechanism, the ruffling device and its actuator being temporarily placed in operative relation by means of a connector comprising a coupling-lever, whose position is automatically controlled by means of an adjustable cam having a detachable connection with the main shaft for moving it forwardly at a slow speed and a returning-spring for imparting to it a quick return movement at the end of each operative movement when its action with the main shaft is temporarily interrupted for the purpose. An adjustable stop is provided to determine the initial position of the pattern-cam, and therefore the period between the initial stitch of a seam and the initial ruffle controlled by the operative portion of the cam, and means are also provided for preventing the action of the cam upon the connector in its return movement. To temporarily prevent its return at the end of an operative movement, the pattern-cam carries a latch adapted to engage a suitable hook capable of being shifted by the operator to release the cam and permit it to assume its initial position and operative relation with its driving mechanism for a succeeding operation. The latch is adapted to be set in inoperative position in order that the automatic disconnection of the pattern-cam from its driving mechanism at the end of each forward movement will permit it to immediately return under the action of its spring to initial position to be again automatically connected with its driving mechanism for a repetition of the preceding operation.

In the drawings annexed the present improvement is represented as applied to a Singer sewing-machine of the No. 44 class, the stitch-forming and feeding mechanisms being only partially shown therein, as their specific construction is not material to the present invention.

Figure 1 is a side elevation of the machine viewed from the side toward the operator, and Fig. 2 a similar view taken from the opposite side. Fig. 3 is a transverse section upon a plane intermediate the upright portion and the head of the bracket-arm looking toward the rear of the machine, and Fig. 4 a similar view looking toward the front of the machine. Fig. 5 is a partial sectional elevation of the rear end portion of the machine

corresponding with Fig. 1. Fig. 6 is an elevation of the primary or driven member of the pattern-cam with its detaining-latch retracted. Fig. 6ª is a detail view of the latch-lever carried by the pattern-cam. Fig. 7 is a similar view of the secondary or adjustable member of the pattern-cam, and Fig. 8 a transverse section of the same. Fig. 9 is an elevation of the pattern-cam in operative relation, together with certain of its controlling devices; and Fig. 10 is a similar view of the same at the end of an operative movement. Fig. 11 is an elevation of the primary member of the pattern-cam similar to Fig. 6, but from the opposite side and showing certain parts in section and the latch in operative position; and Fig. 12 is an edge view of the same. Fig. 13 is an elevation representing the connector for the ruffling device and its actuator with the operative portion of the pattern-cam for controlling the same, and Fig. 14 is a detached view of the driving member of the connector. Fig. 15 is a sectional elevation of the actuator and its connection with the main shaft, and Fig. 16 is a perspective view of the same without its connection with the main shaft. Fig. 17 is a plan view of the slide-bar for controlling the release of the pattern-cam at the end of an operative movement and return of the same to initial position, and Fig. 18 an end view of the same. Fig. 19 is an elevation representing the knee-lever for actuating the presser-foot lifter and the slide-bar.

As represented in the drawings, the machine is constructed with the usual bed-plate 1, carrying the overhanging bracket-arm 2, provided at its forward end with a head 3, in which is mounted the needle-bar 4, carrying the needle 5 and deriving its reciprocating movements, as usual, from the main shaft 6 in a manner well known, the needle 5 coöperating with an oscillating shuttle deriving its movements from a crank 7 upon the main shaft through the pitman 8 and other connections, which are or may be as represented in the United States Patent to Diehl, No. 374,661, dated December 13, 1887. The feeding mechanism is also, as in the said United States Patent to Diehl, except that the main shaft of the present machine is provided with a feed-lifting crank 9 and pitman 10 and with feed-actuating eccentric 11, embraced by the forked lever 12, fulcrumed upon the upper end of a link 13, pivoted, by means of a suitable fulcrum-pin, at its opposite end to the lower end of an arm 14, mounted upon a short shaft 15, carrying the lever 16, by which the position of the fulcrum-pin of the arm 14 is adjusted to vary the feed of the machine.

The ruffling-blade 17 is carried by a spring-pressed rocking plate 18, pivotally connected with the lower end of a two-part adjustable lever 19, fixed upon one end of a rock-shaft 20, which carries at its opposite end a lateral arm 21, pivotally connected with the lower end of a link 22, whose upper end is pivoted, by means of a screw-stud 23, to a block 24, adjustably mounted in a manner well known in a guideway 25 of a swinging arm 26, mounted upon the forward end of a rock-shaft 27, having fixed upon its opposite end a depending arm 28, provided upon its lower extremity with a depending tooth 29 and with a lateral supporting-finger 30, to which is connected, by means of a pivotal screw-pin 31, one end of a coupling-lever 32, having upon its lower edge intermediate the ends an operative shoulder 33, a spring 34 being carried by said fixed arm and adapted to press the lever 32 normally downward. Mounted loosely upon the rock-shaft 27 is a two-armed lever, of which an upper arm 35 is provided with an opening 36, having fitted thereto the eccentric slide-block 37, embracing the actuating-eccentric 38 upon the main shaft 6 and of which the other depending arm 39 is disposed closely adjacent to the fixed arm 28 and is provided at its lower extremity with the spaced lateral teeth 40 and 41, embracing the depending tooth 29 of the fixed lever 28. The operative face of the tooth 29 is so spaced from the shoulder 33 of the lever 32 that when the coupling-lever is in operative position with its shoulder 33 in engagement with the tooth 40 of the actuating lever or actuator 39 the tooth 29 of the arm 28 is in engagement with the adjacent face of the tooth 41 and the arms 28 and 39 are locked together, whereby the ruffling device is operatively connected with its actuator and receives a reciprocation for each rotation of the main shaft, and consequently for each stitch produced by the stitch-forming mechanism. When the coupling-lever 32 is lifted out of such operative position by means presently to be described, the continued vibration of the actuating-arm 39 serves, by the continued engagement of the teeth 41 and 29, to shift the arm 28 into one of its extreme positions, whereby the ruffling-blade is caused to assume its retracted inoperative position, where it remains idle until the coupling-lever 32 is permitted to again drop into operative position.

The coupling-lever 32 is normally supported at its outer end in upper inoperative position by means of a lateral pin 42 at the outer end of a swinging lever 43, pivotally mounted at its opposite end upon a fixed pin 44 upon the inclosing casing and provided with a hanger 45, having a lateral shoulder 46 upon the edge adjacent the pin 42 and a rearwardly-projecting stud 47, adapted to rest upon the periphery of the two-part pattern-cam comprising the primary member 48 and auxiliary member 49, each having a peripheral notch terminating in inclined end portions and relatively adjustable to vary the

effective length of the notch entered by the stud 47. The component members of the pattern-cam are relatively adjustable by means to be hereinafter described in such manner that the peripheral notch is lengthened or shortened by adjustment of its forward end, or that first engaging the stud 47, while the rearward end remains fixed in relation to the end of the traverse of the cam.

As will be readily understood, the supporting-lever 43 for the coupling-lever 32 will fall and rise as its stud 47 follows the contour of the cam when moving forwardly, as indicated by the arrow in Fig. 13, but is prevented from movement upon the retraction of the pattern-cam to initial position in the opposite direction by the engagement with the shoulder 46 of the hanger 45 with the tooth 50 of a detent-lever 51, pivotally mounted upon and depending from a fixed screw-pin 52 and having at its lower end a latch-piece 53, mounted upon a pin 54 within a suitable slot in the lever 51 and having a shoulder adjacent to its pivotal pin normally resting in contact with the inner edge of the inclosing slot, against which it is yieldingly held by means of the flat spring 55, so as to normally project slightly beyond the lower extremity of the detent-lever 51.

When the supporting-lever 43 is in its normal raised position, the detent-lever 51 is normally in engagement with the shoulder 46 of its hanger and serves to lock the same in such position. As the pattern-cam moves forwardly, however, the lateral tripping-pin 56, mounted upon and adjacent the peripheral shoulder of the auxiliary cam member 49, engages the latch-piece 53 and releases the hanger 45, which, with the supporting-lever 43, is permitted to drop to permit the stud 47 to ride down the forward end of the controlling-notch of the pattern-cam, thereby permitting the coupling-lever 32 to drop into operative position. When the lever 43 rises at the end of a ruffling operation, the detent-lever 51 reëngages the shoulder of the hanger 45 to lock it in initial inoperative position, and in the return of the pattern-cam to initial position the tripping-pin 56 merely throws the latch-piece 53 temporarily upward out of its path without affecting the operative position of the detent-lever 51, which continues to retain the supporting-lever 43 in inoperative position and the coupling-lever 32 correspondingly raised out of engagement with the actuator 39.

The means for communicating the forward operative movement of the pattern-cam comprises a ratchet-wheel 57, whose hub 58 is fixed upon the horizontal shaft 59, mounted in fixed bearing-brackets 60 upon the bed-plate 1 and provided upon its rearward end with a worm-wheel 61, meshing with a worm 62 upon the lower end of an upright shaft 63, having upon its upper end a worm-wheel 64, meshing with a worm 65 upon the main shaft 6, the ratchet-wheel 57 thus receiving a slow rotating movement continuously throughout the operation of the stitch-forming mechanism. The auxiliary member 49 of the pattern-cam is provided with a hub 66, loosely mounted upon the shaft 59, and is fitted loosely within the tubular hub 67 of the segmental primary member 48 of the pattern-cam, having the peripheral notch 68 terminating at its forward end in an inclined shoulder 69 and at its rearward end in the similar shoulder 70, the outer edge of this member being overlapped by the projecting peripheral portion 71 of the member 49, terminating at its forward end in the inclined shoulder 72. To the contracted outer end of the hub 67 is fixed the rigid radial arm 73, provided with a clamp-screw 74, entering a segmental slot 75 in the outer end of a similar arm 76, rigidly secured upon the adjacent end of the hub 66. The loosening of the clamp-screw 74 enables the operator to adjust the relative positions of the arms 73 and 76 to vary the effective length of the peripheral notch 68 of the pattern-cam by adjusting the relative positions of the shoulders 69 and 72 so as to vary the duration of the ruffling operation through the action of this operative portion of the cam upon the stud 47, controlling the position of the coupling-lever 32.

As represented in Fig. 12, the cam member 48 is recessed intermediate its outer faces to receive several of the movable parts carried thereby. This member 48 carries a rearwardly-projecting pin 77, upon which is pivoted a pawl 78, having its depending tooth normally pressed by means of a spring 79 into engagement with the peripheral teeth of the ratchet-wheel 57, which latter thus operates to move the cam forwardly during such engagement. The member 48 also carries a pawl-lifter, comprising a cam-head 80, mounted upon a pivotal pin 81 and having a cam-shaped inner edge comprising operative portions 82 and 83 upon opposite sides of the pivotal pin 81, which is provided also with an inwardly-projecting finger 84 with wedge-shaped inner extremity adapted to engage either of two notches 85 in a latch-block 86, mounted between the radial guideways 87 upon the member 48 and pressed outwardly by means of a spring 88, interposed between the bottom of a socket therein and a plate 89 at the end of said guideways.

The cam-head 80 is provided with a laterally-projecting pawl-lifter pin 90, so located in respect of the pivotal pin 81 that when the finger 84 engages one of the notches 85 in the block 86, as represented in Fig. 9, the pin 90 will remain out of contact with the pawl 78; but when the cam-head is shifted so that the finger 84 enters the other notch 85 of the block 86 the pin 90 will be thrown outwardly into engagement with the inner edge of the

pawl 78 and disengage the same from the teeth of the ratchet-wheel 57, Fig. 10. The ratchet-wheel 57 is provided in its rearward face with a circular recess, within which is fitted a disk 91, provided near the periphery at one side and in the path of movement of the part 83 of the cam-piece 80 with a stop-pin 92 and having its hub loosely fitted upon the hub 58 of the ratchet-wheel 57 and provided with a worm-wheel 93, meshing with a worm 94, mounted upon a spindle 95, suitably journaled in the casing and provided upon its outer end with a suitably-milled head 96 and rigidly-attached pointer 97, coöperating with a suitably-graduated dial-plate 98, secured upon the exterior of the casing to indicate the position of the stop-pin 92. As will be obvious, the turning of the spindle 95 causes the circumferential movement of the stop-pin 92 into such adjustment as may be required for its engagement with the part 83 of the cam-piece 80, as indicated in Fig. 11, to effect the reëngagement of the pawl 78 with the ratchet-wheel 57.

The cam member 48 is further provided with a latch-lever 99, pivoted within a suitable recess within the same by means of a pin 100 and having at its free end a tooth 101, fitted to a corresponding recess in the forward edge of the member 48, but pressed normally outward therefrom into the position represented in Fig. 11 by means of a spring 102, interposed between its inner edge and the bottom of a socket therefor in the member 48. The body of the latch-lever 99 is provided with a triangular slot 103, disposed in line with the pivotal pin 100 and having its larger end extended toward the same, said slot being entered through a segmental slot 104 in the member 48 by a pin 105, projecting laterally from the free end of a plate 106, movably secured by means of a pivotal screw 107 with interposed spring-washer 108 upon the member 48 and capable of being shifted toward either end of the slot 104, but retained at either extreme position by the friction imposed by the spring-washer 108. The outer end of the plate 106 is provided with a button 109 for convenience in shifting the same. The edge of the slot 103 nearest the spring 102 is so inclined relative to the contracted end of the slot and the pivotal pin 100 that when the pin 105 is shifted to the upper end of the slot 104 the latch-lever 99 is permitted, under the action of its spring 102, to assume its outer position, with the shoulder of its tooth 101, exposed to perform its normal function; but when the pin 105 is shifted to its other extreme position the tooth 101 is drawn into its recess in the member 48, and thus assumes its inoperative position.

When performing its normal operative movement with the latch-lever 99 in operative position, as represented in full lines in Figs. 3 and 11 and in dotted lines in Figs. 9 and 10, the motion of the cam is continued uniformly until the forward end of the cam-head 80 engages a fixed tripping-stud 110, Figs. 3 and 10, projecting inwardly from the casing, which operates to tilt such cam-head and shift its pawl-lifting pin 90 into engagement with the pawl 78 to retract the same from the ratchet-wheel when the latch-tooth 101 simultaneously rides over a detaining-hook 111, carried by the slide-bar 112, mounted to slide transversely in suitable guideways upon the bed-plate, the pattern-cam being thereby detained in such extreme position wholly disconnected from its driving mechanism.

The slide-bar 112 is provided intermediate its ends with a guiding-channel, to which is fitted a longitudinal rib 113 upon a lateral plate 114, connected with a rack-bar 115, having suitable rack-teeth meshing with a toothed sector-gear 116, formed upon the lower side of the hub 67 of the cam member 48 and having a longitudinal socket to receive one end of a spring 117, whose opposite end bears against a flange 118 upon the free end of a rod 119, carried by the offset portion 120 of the slide-bar 112, provided with the detaining-hook 111.

As will be observed, the spring 117 tends to maintain the rack-bar 115 in extreme position close to the offset member of the slide-bar 112, carrying the detaining-hook, while the movement of the pattern-cam under the action of the ratchet-wheel 57 causes the rack-bar 115 to recede from the detaining-hook 111 and to thereby compress the spring 117, the relatively movable slide-bar 112 being provided for preventing its continued movement with the rack-bar, with a stop-shoulder afforded by the head of a screw $112^a$, adapted to engage the member $112^b$ of the machine-frame to limit its range of movement under the action of the pattern-cam-driving means and interposed spring. By this means the retracting or returning spring 117 is made to serve two functions, first, that of retracting the pattern-cam to intial operative position after release from the detaining-hook 11, and, second, that of yieldingly maintaining the slide-bar 112 in initial position with its stop-screw $112^a$ in engagement with the fixed shoulder $112^b$, and hence holding the detaining-hook 111, carried by such slide-bar in normal operative position for engagement with the latch 101 in its extreme advanced position. The shifting of the slide-bar 112 to disengage the detaining-hook 111 from the latch-tooth 101, as represented in dotted lines in Fig. 10, serves to release the pattern-cam and permit it to be returned to initial position under the action of the spring 117, rack-bar 115, and toothed sector 116, with a momentum sufficient to effect the operative engagement of the part 83 of the cam-head 80 with the stop-pin 92 for tilting

the cam-head to withdraw the lifting-pin 90 from contact with the pawl 78, and thereby permit the latter to engage the teeth of the ratchet-wheel 57, as before described.

While the shifting of the lever 112 might readily be done by hand, I prefer to effect such operation by means of a knee-lever and suitable connected mechanism. To this end I make use of presser-foot-lifting mechanism of well-known form and consisting of a swinging rod 121, carrying the usual knee-plate 122 and secured upon a rock-shaft 123, mounted in suitable brackets 124 upon the under side of a supporting-table 125, which rock-shaft carries a rigid arm 126, engaging one end of a rock-lever 127 upon the fixed pivotal pin 128, with its other arm connected by means of a rod 129 with the rear end of a rock-lever 130, mounted upon the bracket-arm of the machine, and having its other end connected by means of the usual slotted link 131 with a block 132, fixed upon the presser-bar 133, which latter is also engaged by the cam-shaped upper portion of the hand-lever 134. Upon the rod 129, slightly above the bed-plate, is fixed a collar 135, having a laterally-projecting finger 136, adapted to engage the outer end of a lateral arm 137, carried by a rock-shaft 138, which has also a depending arm 139, entering a slot 140 in the adjacent end of the slide-bar 112. The collar 135 is preferably so adjusted upon the rod 129 that the actuation of the latter to partially raise the presser-foot for the mere shifting of the goods can be effected without actuating the arm 139 to retract the slide-bar 112 for disengagement of the interlocking parts 101 and 111; but the further actuation of the presser-foot-lifting mechanism to give the presser-foot its extreme lift serves through the parts 136, 137, and 139 to retract the slide-bar 112 and permit the pattern-cam to assume operative relation with its driving mechanism. It is evident that the hand-lever 134 may be operated to raise the presser-foot without affecting in any way the ruffling mechanism, as herein described.

I have represented in the drawings an edge folding and guiding attachment 141 suitable for presenting the several parts of a garment to be stitched together in inserting the yoke; but the same is not specifically described herein, as it forms no part of the present invention.

While I have shown and described herein a form of the present improvement which I consider preferable, it is evident that its various component parts may be widely varied without departing from the essence of the invention. Thus the returning device for causing the pattern-cam to reassume initial position is not necessarily of the yielding character represented herein, nor is a spring requisite for performing the necessary function, nor is the particular form of clutch by which the pattern-cam is connected with its advancing mechanism essential to the effective operation of the device, while the character of the form and arrangement of the ruffler proper may be that of any type of such mechanism suitable for the purpose. While the so-called "manually-actuated" controlling device for initiating the action of the ruffler-timing mechanism is preferably of the kind actuated from beneath the work-plate of the machine and connected with a knee-lever or treadle, it is evident that for certain classes of work other equivalent controlling means may be equally suitable.

As represented herein, the present improvement is designed for producing a repeated pattern, including a single ruffled section of fabric intermediate two plain sections. However, it is evident that the number and arrangement of the component independently-adjustable operative parts of the pattern-cam, such as the component members 48 and 49, as represented herein, may be readily constructed to produce a pattern comprising any desired number of consecutive ruffles and any desired spacing of the groups or clusters of ruffles in their application to a section of fabric, the present improvement being designed especially for the ruffling and stitching of shirts and similar articles requiring a fullness of the body of the garment at the middle portion of the seam, or such garments as skirts, in which the fullness produced by ruffling is desired at regular intervals around the same, while providing for the stitching of unruffled or ungathered portions of the garment to any extent while the ruffling device and its controlling mechanism remain entirely inactive.

While the machine as herein represented is adapted for production of a series or succession of stitches upon an unruffled portion of fabric immediately succeeding the actuation of the controlling mechanism of the ruffling device and prior to each ruffling operation, it is evident that the number of such preparatory stitches may be varied to any extent by suitable adjustment of the two cam members 48 and 49 and that in any case the controlling mechanism comprises two portions one of which may be manually timed to cause the ruffling device to operate upon the fabric at any point determinable at will by the operator in locating each individual group of ruffles and the other of which is invariably automatically timed thereafter to cause the ruffling device to cease its operation upon the fabric after the production of a group or cluster of ruffles or crimps of predetermined number. The stop-pin 92 may obviously be set in such position that the retraction of the pattern-cam will be completed immediately after the pin 56 has thrust aside the latch-piece 53 in its retrograde movement, so that the first step of

the operative advance movement of the cam will cause the engagement of the pin 56 with the latch-piece, and thus the release and consequent descent of the stud 47 for causing the initial operation of the ruffling device. This condition of adjustment adapts the mechanism for practically a manual establishment and automatic interruption of the ruffling operation, whereby a group or cluster of ruffles of predetermined number may be formed at any desired position in the line of stitching, depending solely upon the will of the operator.

Heretofore it has been proposed to fit a ruffling and stitching machine with means at all times under the control of the operator for throwing the ruffling device into and out of operation, whereby the operator's skill was called into play not only in locating the ruffled section of a garment at the proper position in the seam while the stitch-forming mechanism was running, but in determining the number and size of the ruffles or plaits formed in such ruffled section. Inasmuch as the parts of the garment to be united were composed of pieces of fabric of different length having overlapped edges and the ruffling of the longer of such pieces was designed to have just sufficient fullness ruffled into the same to cause its ends at the completion of a seam to match those of the overlying pieces of fabric, the exclusive manual control of the ruffling device referred to has in practice been found a source of much difficulty, necessitating the retardation of the speed of the machine at the end of each seam to form a supplemental ruffle or gather to that previously produced in the middle length of a seam in order to take up any superfluous length of the partially-ruffled strip, and thereby shorten it the required amount. By providing means whereby the position only of the ruffle in the seam is under the control of the operator, while the number and uniformity of the ruffles is determined absolutely by mechanism entirely outside of such control, I am enabled to provide the most perfect conditions for uniform work in the class of operation referred to and to adapt machines of this general class to operators of only moderate skill, thus saving in the cost both in the quality of labor and amount of time employed in producing the work for which the machine is designed.

In order to adapt the machine for a further adjustment to permit the ruffling device to act continuously and without control of its timing mechanism, the pin 42 of the supporting-lever 43 for the coupling-lever 32 is preferably made removable, and the transfer of such pin to a hole $42^a$ in the lever 43 permits the coupling-lever 32 to remain continuously in operative relation with the driving and driven vibrating arms 39 and 28, whereby the machine is adapted to perform the usual continuous stitching and ruffling operations.

In the appended claims certain parts are referred to as being "carried by" the pattern-cam, by which it is to be understood that such parts are movable with the latter in performing their described functions, but not necessarily mounted directly thereon. The term "pattern-cam" is used generically herein as a designation for a controlling member constructed and adapted to control the length of the period of action of the ruffling device by controlling the position of the coupling-lever 32, which, with the connecting parts acting in conjunction therewith, I have termed herein the "connector." By this term as used in the appended claims is to be understood a member or members acting in conjunction with a ruffling device and operating mechanism therefor of any well-known or suitable type for rendering such ruffling device alternately active and inactive in performing the ruffling operations for which it is designed.

Having set forth the nature of the invention, what I claim herein is—

1. In a sewing-machine, a ruffling device, an actuator therefor, and means initially under the control of the operator whereby the ruffling device is caused to be operatively connected with its actuator to produce a series of ruffles of predetermined number and is thereafter automatically disconnected therefrom.

2. In a sewing-machine, a ruffling device, an actuator therefor, automatically-operable means adapted to act successively in operatively connecting and disconnecting the ruffling device and its actuator, automatic means normally acting to prevent the recurrence of the connecting and disconnecting operations, and manually-controlled means for rendering said normally acting means ineffective in performing its normal function.

3. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device, an actuator therefor connected with the stitch-forming mechanism, automatically-acting means for operatively connecting said ruffling device with its actuator after a predetermined number of stitches have been formed and thereafter disconnecting the same after a plurality of ruffles of predetermined number have been formed, automatic means normally acting to prevent the recurrence of the connecting and disconnecting operations, and means under the control of the operator for rendering said normally acting means ineffective in performing its normal function.

4. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device, an actuator therefor connected with the stitch-forming mechanism, a normally

inoperative connector for the ruffling device and its actuator, and automatically-acting means including a to-and-fro moving pattern-cam for actuating said connector in controlling the operation of the ruffling device.

5. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device, an actuator therefor connected with the stitch-forming mechanism, a normally inoperative connector for the ruffling device and its actuator, and automatically-acting means for actuating said connector in controlling the operation of the ruffling device comprising a pattern-cam with means for imparting thereto advance and return movements, a follower actuated by said cam, and means for maintaining said follower out of operative relation with said cam during its return movement.

6. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device, operating means therefor, automatically-acting means for establishing and interrupting operative relation between said ruffling device and its operating means, comprising a moving device and means for adjusting the length of its traverse whereby the period of operation of the stitch-forming mechanism prior to the establishment of operative relation of the ruffling device with its actuating means may be varied, and means whereby said moving device may be set in operation.

7. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device, operating means therefor, automatically-acting means for establishing and interrupting operative relation between said ruffling device and its operating means, comprising a moving device having an adjustable operative portion and means for adjusting the length of its traverse, whereby the relative periods of operation of the ruffling device and of the stitch-forming mechanism prior to the ruffling operation in the production of each seam is determined, and means whereby said moving device may be set in operation.

8. In a sewing-machine, the combination with a ruffling device including a rock-shaft provided with a vibrating arm, of an actuator therefor provided with a vibrating arm disposed adjacent to said vibrating arm, a coupling member carried by one of said vibrating arms and directly engaging the other whereby said arms may be connected, and automatically-acting means for throwing said coupling member into and out of operative position for connecting and disconnecting said arms.

9. In a sewing-machine, the combination with a ruffling device including a rock-shaft provided with a vibrating arm, of an actuator therefor provided with a vibrating arm disposed adjacent to said vibrating arm, one of said arms carrying spaced coupling-shoulders and the other of said arms having a shouldered coupling-lever and a rigid shoulder adapted to be brought into interlocking relation with the shoulders of the first-mentioned arm, and automatically-acting means for throwing said lever into and out of operative position for effecting the connection and disconnection of said arms.

10. In a sewing-machine, the combination with a ruffling device including a vibrating arm, of an actuator therefor provided with a vibrating arm disposed adjacent thereto, a coupling member carried by one of said arms and adapted to form an operative connection with the other of said arms, and automatically-acting means, including a pattern-cam comprising relatively adjustable parts each carrying one of a plurality of cam projections adapted to be shifted into different relative positions for affording adjustment for the length of the operative portion of the cam, whereby said coupling member is thrown into and out of operative position to effect the connection and disconnection of said vibrating arms.

11. In a sewing-machine, the combination with a ruffling device including a vibrating arm, of an actuator therefor provided with a vibrating arm disposed adjacent thereto, a coupling-lever carried by one of said arms and adapted to form an operative connection with the other of said arms, a supporting member for controlling the position of said coupling-lever, a to-and-fro moving pattern-cam for actuating said supporting member, and a locking device operative during the return movement of said cam after an operative movement to maintain said supporting member immovable.

12. In a sewing-machine, the combination with a ruffling device including a vibrating arm, of an actuator therefor provided with a vibrating arm disposed adjacent thereto, a coupling-lever carried by one of said arms and adapted to form an operative connection with the other of said arms, a supporting member for controlling the position of said coupling-lever, a to-and-fro moving pattern-cam for actuating said supporting member, a retaining-hook normally locking said supporting member in position, and means whereby said hook is rendered inoperative during the advance or operative movement of said pattern-cam.

13. In a sewing-machine, the combination with a ruffling device including a vibrating arm, of an actuator therefor provided with a vibrating arm disposed adjacent thereto, a coupling-lever carried by one of said arms and adapted to form an operative connection with the other of said arms, a supporting member for controlling the position of said coupling-lever, a to-and-fro moving pattern-cam for actuating said supporting member, a

retaining-hook normally locking said supporting member in position, a pivoted latch-piece carried by and held in contact with a rigid shoulder upon said retaining-hook, and a pin or projection carried by said pattern-cam and adapted by engagement with said latch-piece in its operative movements to shift said retaining-hook to release the supporting member for actuation by said cam, but to move aside said latch-piece only in the return movement of said cam.

14. In a sewing-machine, the combination with a ruffling device including a rock-shaft provided with a lateral arm having a coupling-tooth upon its extremity, a coupling-lever pivotally mounted upon said arm and provided with a coupling-shoulder, an actuator comprising a vibrating arm mounted loosely upon said rock-shaft and provided with spaced coupling-teeth one of which is adapted to engage the coupling-tooth of the first-named arm and the other of which is adapted to engage the shoulder of said coupling-lever, and means for shifting said coupling-lever to bring its shoulder into and out of the path of movement of its respective tooth of said vibrating arm whereby said arms are respectively coupled and uncoupled.

15. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a normally inoperative connector for the ruffling device and its actuator, and means for controlling said connector comprising a pattern-cam including two relatively adjustable members containing respectively the operative portions whereby said connector is operated to first connect and then disconnect said ruffling device and its actuator.

16. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a normally inoperative connector for the ruffling device and its actuator, and means for controlling said connector comprising a pattern-cam including two members disposed in axial relation and each provided with a hub carrying a rigid arm, and means for securing said arms in fixed relation in different positions of adjustment.

17. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device, an actuator therefor connected with the stitch-forming mechanism, a normally inoperative connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, and means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, means for throwing said clutch parts into and out of operative engagement, and means for returning said pattern-cam to initial position after each disengagement of said clutch parts.

18. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device, an actuator therefor connected with the stitch-forming mechanism, a normally inoperative connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, and means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, means for throwing said clutch parts into and out of operative engagement, and means acting independently of said positively-driven clutch part for returning said pattern-cam to initial position after each disengagement of said clutch parts.

19. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device, an actuator therefor connected with the stitch-forming mechanism, a normally inoperative connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, and means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, means for returning said pattern-cam to initial starting position after each advance operative movement, automatically-acting means for throwing said clutch parts into operative engagement at initial starting position, and means for throwing said clutch parts out of operative engagement at the end of each advance operative movement.

20. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device, an actuator therefor connected with the stitch-forming mechanism, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, and means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, automatically-acting means for throwing said clutch parts into and out of operative engagement at the ends of each operative movement, and means for returning said pattern-cam to initial position after each disengagement of said clutch parts.

21. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, and spaced tripping devices for successively throwing said clutch parts into and out of operative engagement.

22. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, a rocking member whereby the engagement and disengagement of said clutch parts is effected, tripping-studs disposed at opposite ends of the traverse of said pattern-cam for tilting said rocking member in controlling said clutch, and means for returning said pattern-cam to initial position after each disengagement of said clutch parts.

23. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, a rocking member whereby the engagement and disengagement of said clutch parts is effected, fixed and adjustable tripping-studs disposed respectively at opposite ends of the traverse of said pattern-cam for tilting said rocking member in controlling said clutch, and means for returning said pattern-cam to initial position after each disengagement of said clutch parts.

24. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a positively-driven ratchet-wheel, a pawl carried by said pattern-cam and adapted to engage said ratchet-wheel, a rocking member whereby the engagement and disengagement of said ratchet and ratchet-wheel is effected, tripping-studs disposed at opposite ends of the traverse of said pattern-cam for tilting said rocking member in controlling said pawl, and means for returning said pattern-cam to initial position after each disengagement of the pawl from said ratchet-wheel.

25. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a positively-driven ratchet-wheel, a pawl carried by said pattern-cam and adapted to engage said ratchet-wheel, a cam-head pivotally mounted upon said pattern-cam and having two operative portions disposed upon opposite sides of its pivotal point and adapted to lift said pawl from engagement with the ratchet-wheel, tripping-studs disposed at opposite ends of the traverse of said pattern-cam and adapted to engage respectively the operative portions of said cam-head for tilting it alternately to effect the engagement and disengagement of said pawl and ratchet-wheel, and means for returning said pattern-cam to initial position after each disengagement of the pawl from said ratchet-wheel.

26. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, a rocking member whereby the engagement and disengagement of said clutch parts is effected, a finger rigidly connected with said rocking member, a yielding latch-block carried by said pattern-cam and provided with two notches entered by said rigid finger in the extreme positions of said rocking member, tripping-studs disposed at opposite ends of the traverse of said pattern-cam for tilting said rocking member alternately into its said extreme positions in controlling said clutch, and means for returning said pattern-cam to initial position after each disengagement of said clutch parts.

27. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, a rocking member whereby the engagement of said clutch parts is effected, a tripping-stud mounted upon a carrier movable concentrically with the pattern-cam and adapted to engage said rocking member to effect the engagement of said clutch parts, means for circularly adjusting said carrier, a tripping-stud for engagement with said rocking member at the end of the advance operative movement of said pattern-cam to disengage said clutch parts, and means for returning said pattern-cam to initial position after each disengagement of said clutch parts.

28. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, a rocking mem-

ber whereby the engagement of said clutch parts is effected, a tripping-stud mounted upon a carrier movable concentrically with the pattern-cam and adapted to engage said rocking member to effect the engagement of said clutch parts, a rotary spindle connected with said carrier for adjusting the position of said tripping-stud and provided with means within the reach of the operator for turning the same, a tripping-stud for engagement with said rocking member at the end of the advance operative movement of said pattern-cam to disengage said clutch parts, and means for returning said pattern-cam to initial position after each disengagement of said clutch parts.

29. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, a rocking member whereby the engagement of said clutch parts is effected, a tripping-stud mounted upon a carrier movable concentrically with the pattern-cam and adapted to engage said rocking member to effect the engagement of said clutch parts, a rotary spindle connected with said carrier for adjusting the position of said tripping-stud and provided with means within the reach of the operator for turning the same and with a lateral pointer, a fixed graduated scale or dial-plate coöperating with said pointer in indicating the position of said tripping-stud, a second tripping-stud for engagement with said rocking member at the end of the advance operative movement of said pattern-cam to disengage said clutch parts, and means for returning said pattern-cam to initial position after each disengagement of said clutch parts.

30. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, means for effecting the engagement and disengagement of said clutch parts, and continuously-operative means permanently connected with said pattern-cam for inducing its return to initial position after disengagement of said clutch parts.

31. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for actuating said pattern-cam comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, means for effecting the engagement and disengagement of said clutch parts, and means including a spring placed under tension by the operative movement of said cam to return the same to initial position after disengagement of said clutch parts.

32. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for imparting to said pattern-cam an advance operative movement and comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, means for effecting the engagement and disengagement of said clutch parts, a latch member carried by said pattern-cam, a slide-bar, a detaining-hook thereon adapted for engagement with said latch member, a movably-mounted rack-bar, a gear connected with said pattern-cam and meshing with said rack-bar, a returning-spring connected with said rack-bar and adapted to actuate the same for returning the pattern-cam to initial position after disengagement of said clutch parts, and means for actuating said slide-bar.

33. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for imparting to said pattern-cam an advance operative movement and comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, means for effecting the engagement and disengagement of said clutch parts, a latch member carried by said pattern-cam, a slide-bar, a detaining-hook thereon adapted for engagement with said latch member, a rack-bar movably mounted upon said slide-bar, a gear connected with said pattern-cam and meshing with said rack-bar, a spring interposed between said rack-bar and slide-bar for inducing the return of said pattern-cam to initial position when its clutch parts are disengaged, and means for shifting said slide-bar to disengage the retaining-hook from said latch member.

34. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for imparting to said pattern-cam an advance operative movement and comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, means for effecting the engagement and disengagement

of said clutch parts, a latch member carried by said pattern-cam, a slide-bar, a detaining-hook thereon adapted for engagement with said latch member, a rack-bar movably mounted upon said slide-bar, a gear connected with said pattern-cam and meshing with said rack-bar, a shouldered thrust-rod connected with said slide-bar and passing through said rack-bar, a spring interposed between the shoulder of said thrust-rod and said rack-bar, a stop for limiting the movement of said slide-bar under the action of said spring, and means for shifting said slide-bar to disengage the retaining-hook from said latch member.

35. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for imparting to said pattern-cam an advance operative movement and comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, means for effecting the engagement and disengagement of said clutch parts, a latch member carried by said pattern-cam, a slide-bar, a detaining-hook thereon adapted for engagement with said latch member, a movably-mounted rack-bar, a gear connected with said pattern-cam and meshing with said rack-bar, a returning-spring connected with said rack-bar and adapted to actuate the same for returning the pattern-cam to initial position after disengagement of said clutch parts, a presser-foot, lifting mechanism therefor, and common actuating means connected with the presser-foot lifter and said slide-bar for operating the same by a continuous movement thereof.

36. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means for imparting to said pattern-cam an advance operative movement and comprising a clutch including a positively-driven part and a coacting part carried by said pattern-cam, means for effecting the engagement and disengagement of said clutch parts, a latch member carried by said pattern-cam, a slide-bar, a detaining-hook thereon adapted for engagement with said latch member, a movably-mounted rack-bar, a gear connected with said pattern-cam and meshing with said rack-bar, a returning-spring connected with said rack-bar and adapted to actuate the same for returning the pattern-cam to initial position after disengagement of said clutch parts, a presser-foot, lifting mechanism therefor, and common actuating means connected with the presser-foot lifter and said slide-bar and arranged and adapted to successively actuate the presser-foot-lifting mechanism and the slide-bar to detach the detaining-hook from the latch member by a continuous two-stage movement.

37. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for shifting said connector in controlling the operation of the ruffling device, positively-driven advancing means for said pattern-cam and means acting yieldingly thereon for retracting the same to initial position, a clutch device for alternately coupling and uncoupling said pattern-cam and its positively-acting advancing means, means for operating said clutch device at the ends of the traverse of said pattern-cam, a latch member carried by said pattern-cam, a slide-bar and a detaining-hook thereon for engaging said latch member to retain the pattern-cam in its advance position, a presser-foot, lifting mechanism therefor including a rod and means for actuating it and provided with a lateral shoulder or projection, and a rocking member having one arm connected with said slide-bar and another arm lying in the path of movement of the shoulder upon said reciprocating rod, whereby the movement of the latter in lifting the presser-foot causes the shifting of said slide-bar to disengage its detaining-hook from said latch member.

38. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means including a clutch for imparting a positive advance movement to said pattern-cam, yieldingly-acting means for returning said pattern-cam to initial position, means for effecting the disengagement and engagement of the driven from the driving member of said clutch at the ends of the advance and return movements of said pattern-cam, a latch member carried by said pattern-cam, a detaining member for engagement with said latch member in retaining the pattern-cam in advance position, and means under the control of the operator for disengaging said latch and detaining members to enable the pattern-cam to return to initial position.

39. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means including a clutch for imparting a positive advance movement to said pattern-cam, yieldingly-acting means for returning said pattern-cam to initial position, means for effecting the disengagement and engagement of the driven from the driv-

ing member of said clutch at the ends of the advance and return movements of said pattern-cam, an adjustable latch member carried by said pattern-cam, a detaining member for engagement with said latch member in retaining the pattern-cam in advance position, means for adjusting the position of said latch member into operative or inoperative relation with said detaining member, and means under the control of the operator for disengaging said latch and detaining members to enable the pattern-cam to return to initial position.

40. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means including a clutch for imparting a positive advance movement to said pattern-cam, yieldingly-acting means for returning said pattern-cam to initial position, means for effecting the disengagement and engagement of the driven from the driving member of said clutch at the ends of the advance and return movements of said pattern-cam, a spring-pressed latch-lever carried by said pattern-cam and provided with a cam-shaped edge, a shifting stop-pin adapted to be set to engage the cam edge of said latch-lever to adapt the same to assume different operative positions, a detaining member adapted to be engaged by said latch-lever in one of its adjustments in the advance position of the pattern-cam, and means under the control of the operator for disengaging said latch and detaining members to enable the pattern-cam to return to initial position.

41. In a sewing-machine, the combination with a ruffling device, of an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for actuating said connector in controlling the operation of the ruffling device, means including a clutch for imparting a positive advance movement to said pattern-cam, yieldingly-acting means for returning said pattern-cam to initial position, means for effecting the disengagement and engagement of the driven from the driving member of said clutch at the ends of the advance and return movements of said pattern-cam, a spring-pressed latch-lever carried by said pattern-cam and provided with a slot formed with a cam-shaped edge, a swinging lever-plate pivotally mounted upon said pattern-cam eccentrically to said cam-shaped edge and carrying a stop-pin entering said slot to adapt the same to assume different operative positions, a detaining member adapted to be engaged by said latch-lever in one of its adjustments in the advance position of the pattern-cam, and means under the control of the operator for disengaging said latch and detaining members to enable the pattern-cam to return to initial position.

42. In a ruffling and stitching machine, the combination with stitch-forming mechanism, of a ruffling device, an actuator therefor, a connector for the ruffling device and its actuator, a pattern-cam for controlling said connector and means for actuating the same, and normally stationary means under the control of the operator whereby said pattern-cam may be maintained immovable and detached from its operating means for an indefinite period.

43. In a ruffling and stitching machine, the combination with stitch-forming mechanism, of a ruffling device, an actuator therefor, a connector for the ruffling device and its actuator, a to-and-fro moving pattern-cam for controlling said connector and actuating means for communicating to the same its operative movements in one direction, means whereby said pattern-cam may be caused to remain immovable and detached from its operating means, means for preventing the coaction of the connector with the pattern-cam in the return movement of the latter, and means for returning the pattern-cam to initial operative position and for re-establishing operative relation between the same and its said actuating means.

44. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device comprising a ruffling or crimping blade, means for operating the same and means for controlling said operating means, including a cam member provided with a cam portion, means to rotate said cam member, and means for connecting said cam member with and disconnecting it from its rotating means, for automatically controlling the action and inaction of the crimping-blade for forming a cluster of plaits or gathers at a predetermined point in the line of seam.

45. In a sewing-machine, the combination with stitch-forming mechanism, of a ruffling device comprising a ruffling or crimping blade, means for operating the same and means for controlling said operating means, including a cam, means to rotate it and independent means for adjusting the cam relatively to its rotating means, the cam-adjusting mechanism being operable independently of the sewing elements to reset the cam for each new seam and thereby insure the proper location of the plaits or gathers.

46. In a sewing-machine, a stitch-forming mechanism, a ruffling device, operating means therefor, a circularly-moving member, actuating means therefor and means coöperating therewith in controlling the relation of said operating means with the ruffling device for effecting successively the action and inaction of the latter, and means whereby said member may be disconnected

from its actuating means and reset in initial operative position preparatory to a ruffling operation.

47. In a sewing-machine, a stitch-forming mechanism, a ruffling device, operating means therefor, a to-and-fro moving member and means coöperating therewith in controlling the relation of said operating means with the ruffling device for effecting successively the action and inaction of the latter, and means whereby said member may be reset in initial operative position preparatory to a ruffling operation.

48. In a sewing-machine, stitch-forming mechanism, a ruffling device, operating means therefor, means including a controlling member and actuating means therefor whereby operative relation between said operating means and the ruffling device may be successively established and interrupted, and means adapted either to act automatically at uniformly-recurring intervals or to be manually actuated at adjustable intervals in connecting and disconnecting said controlling member and its actuating means.

49. In a sewing-machine, stitch-forming mechanism, a ruffling device and means for controlling the same for the production of groups or clusters of ruffles and adjacent unruffled spaces in the material operated upon, manually-controlled means whereby the ruffling device is caused to operate, and automatically-acting means for thereafter restraining said device from operation until a subsequent actuation by said manually-controlled means.

50. In a sewing-machine, a stitch-forming mechanism, a ruffling device, means for operating the same, and means for controlling said operating means including a cam, means for actuating said cam, and means initially under the control of the operator whereby said cam may be connected to and disconnected from its actuating means for effecting the production of a cluster of ruffles at a predetermined position in a stitched seam.

51. In a sewing-machine, a stitch-forming mechanism, a ruffling device, means for operating the same, and means for controlling said operating means, including a cam, means for actuating said cam, and normally stationary means initially under the control of the operator whereby said cam may be caused to be connected to and disconnected from its actuating means while the stitch-forming mechanism is in operation for effecting the production of a cluster of ruffles at a predetermined position in a stitched seam.

52. In a sewing-machine, the combination with stitch-forming mechanism, of means coöperating therewith in operation upon the work, and a controlling device for said means comprising a to-and-fro moving cam member, a follower therefor, a connection between said follower and said means, means for imparting to said cam member alternate positive advance movements and retrograde movements, and means whereby the length of traverse of such cam member may be adjusted.

53. In a sewing-machine, a stitch-forming mechanism and a cloth-feeding mechanism, a crimping-blade and connections between said stitch-forming mechanism and the crimping-blade for operating the crimping-blade and for determining the time of action and inaction of the crimping-blade, and the location of the plaits or gathers in the seam, said connections including a circularly-moving cam and resetting devices therefor.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT HARRISON DE VOE.

Witnesses:
HENRY J. MILLER,
H. A. KORNEMANN.