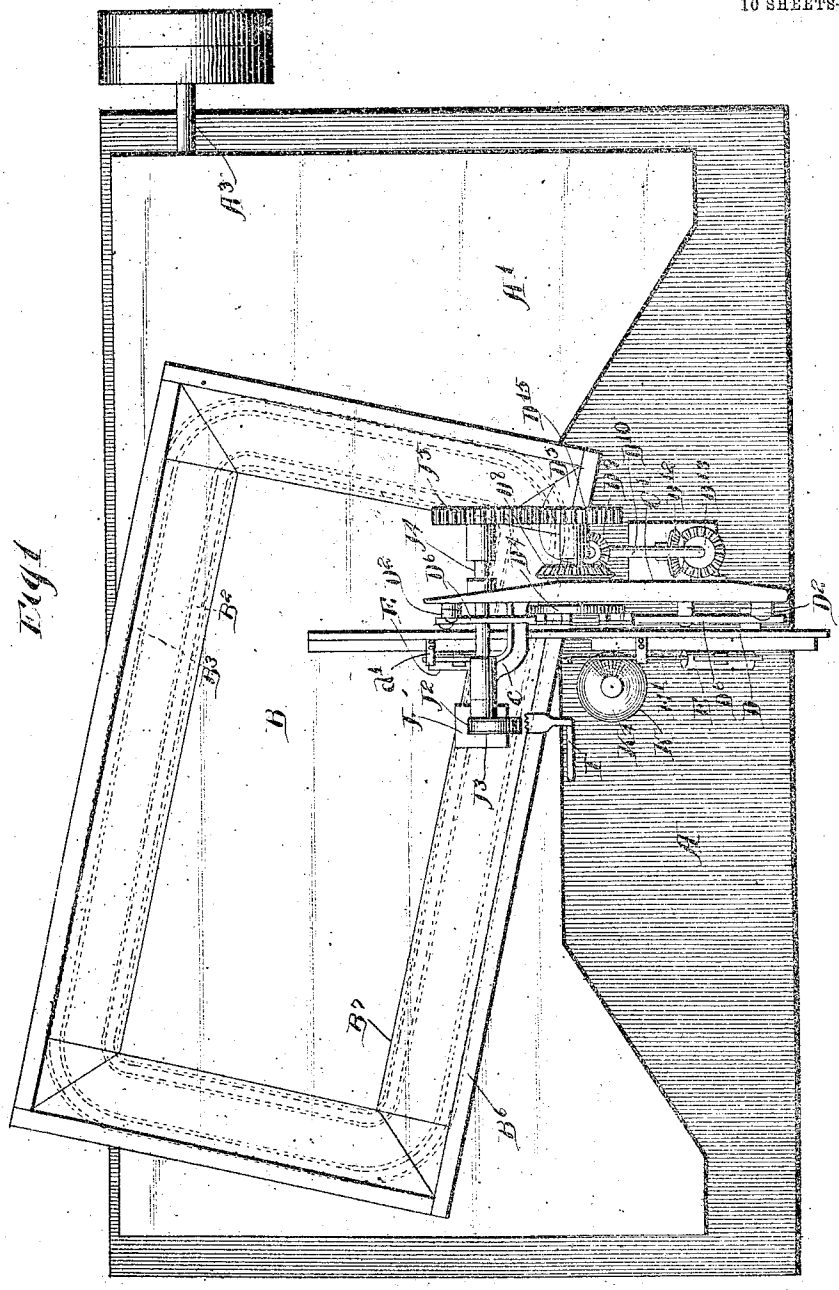
No. 810,882. PATENTED JAN. 23, 1906.

C. N. PHELPS.

MATTRESS SEWING MACHINE.

APPLICATION FILED AUG. 31, 1901. RENEWED JUNE 15, 1905.

10 SHEETS—SHEET 1.



Witnesses:-
Earl A. Crawford
William H. Hall.

Inventor:
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his Attorneys

No. 810,882. PATENTED JAN. 23, 1906.

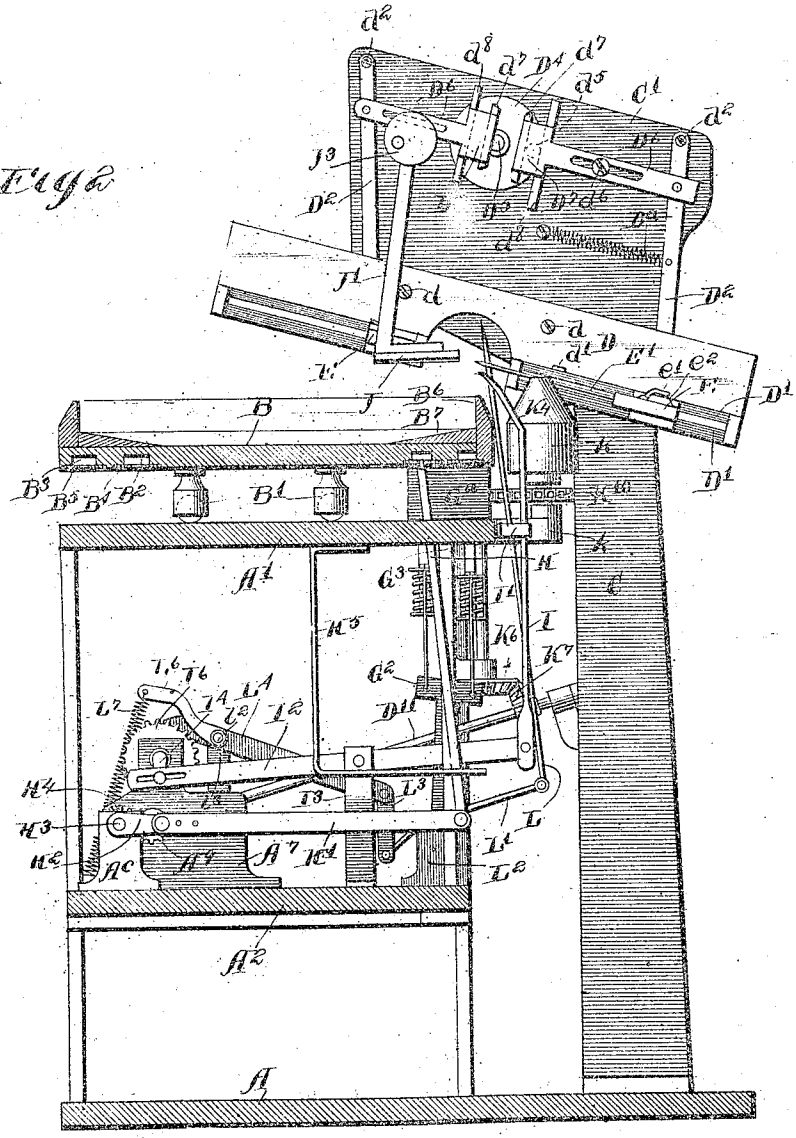
C. N. PHELPS.

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APPLICATION FILED AUG. 31, 1901. RENEWED JUNE 15, 1905.

10 SHEETS—SHEET 2.

Fig 2



Witnesses:-
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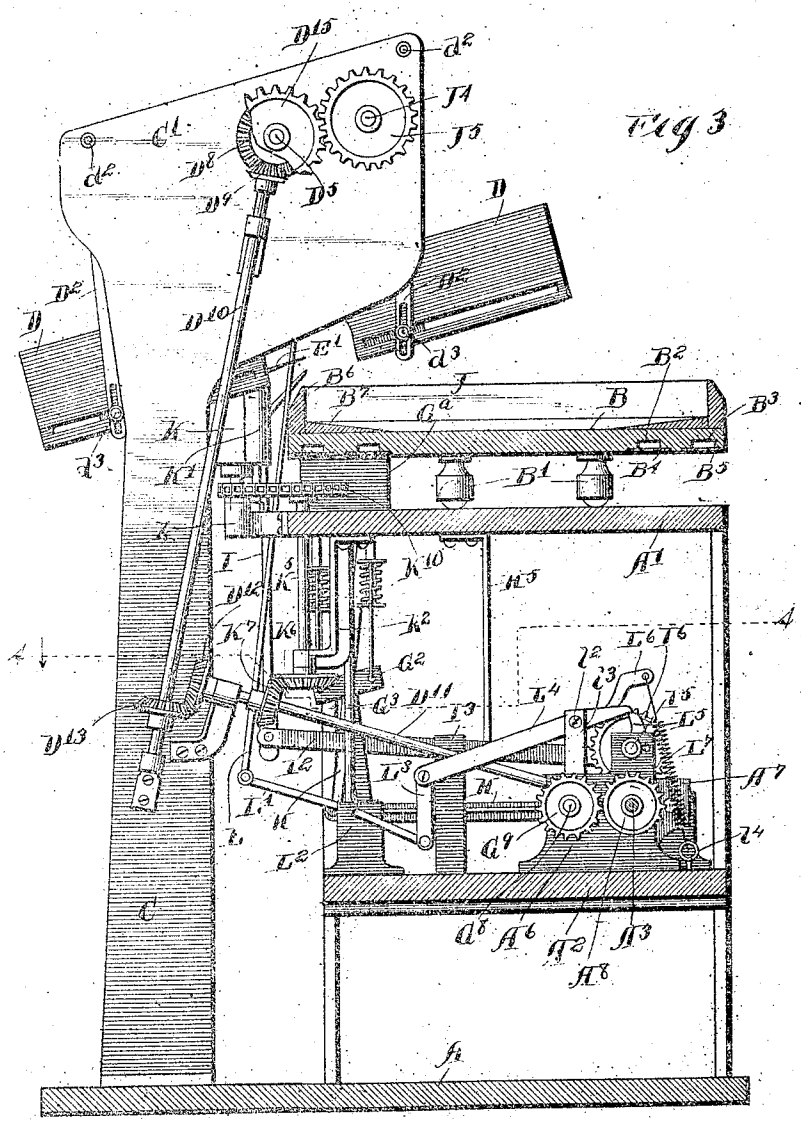
C. N. PHELPS.

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10 SHEETS—SHEET 3.

Fig 3



Witnesses:
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C. N. PHELPS.

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10 SHEETS—SHEET 4.

Fig 4.

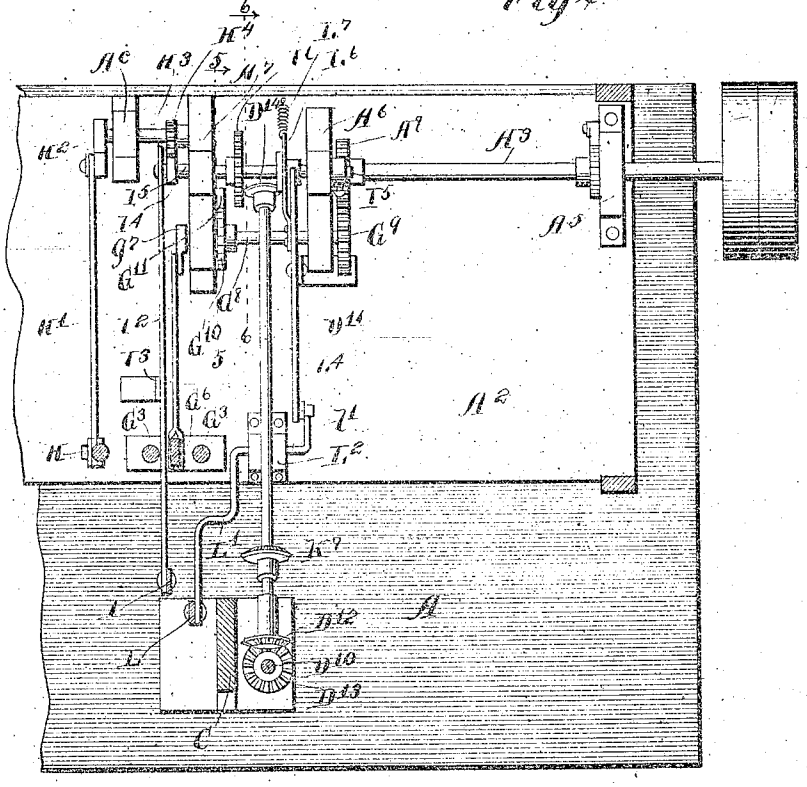


Fig 5.

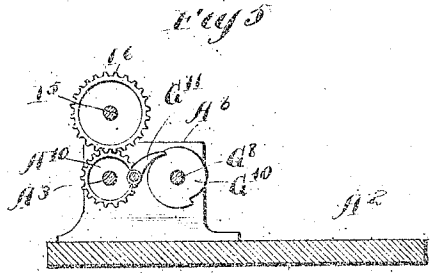
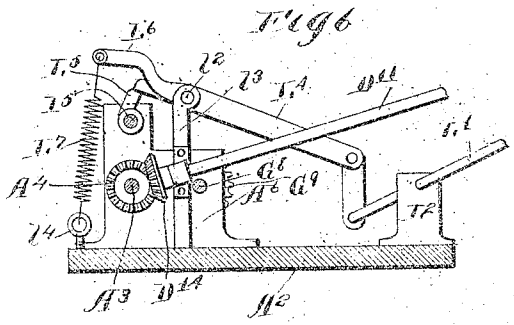


Fig 6.



Witnesses:
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No. 810,882. PATENTED JAN. 23, 1906.

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MATTRESS SEWING MACHINE.

APPLICATION FILED AUG. 31, 1901. RENEWED JUNE 15, 1905.

10 SHEETS—SHEET 5.

Fig 7

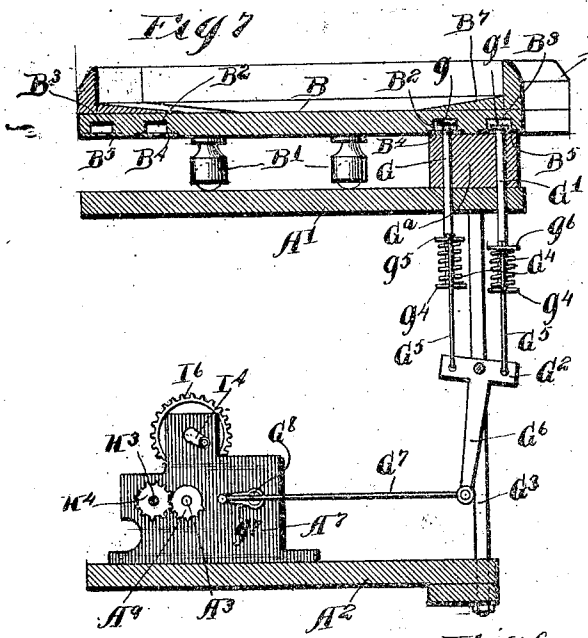


Fig 8

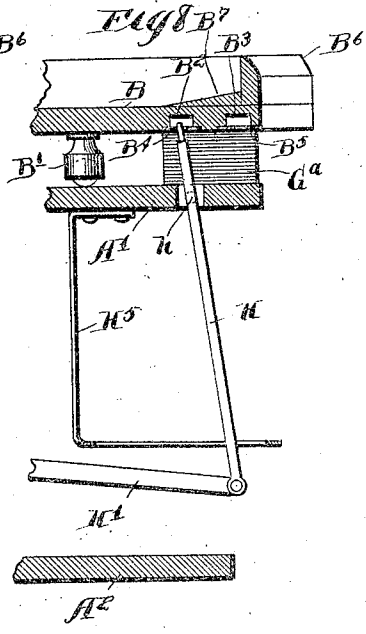
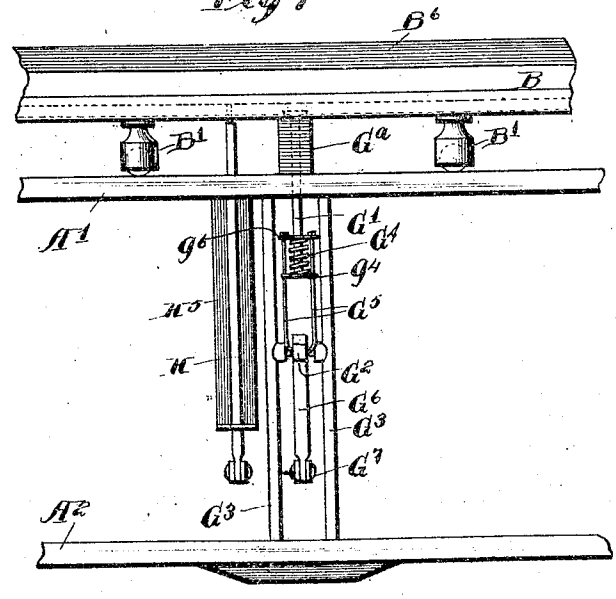


Fig 9



Witnesses:-
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MATTRESS SEWING MACHINE.

APPLICATION FILED AUG. 31, 1901. RENEWED JUNE 15, 1905.

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Fig 10

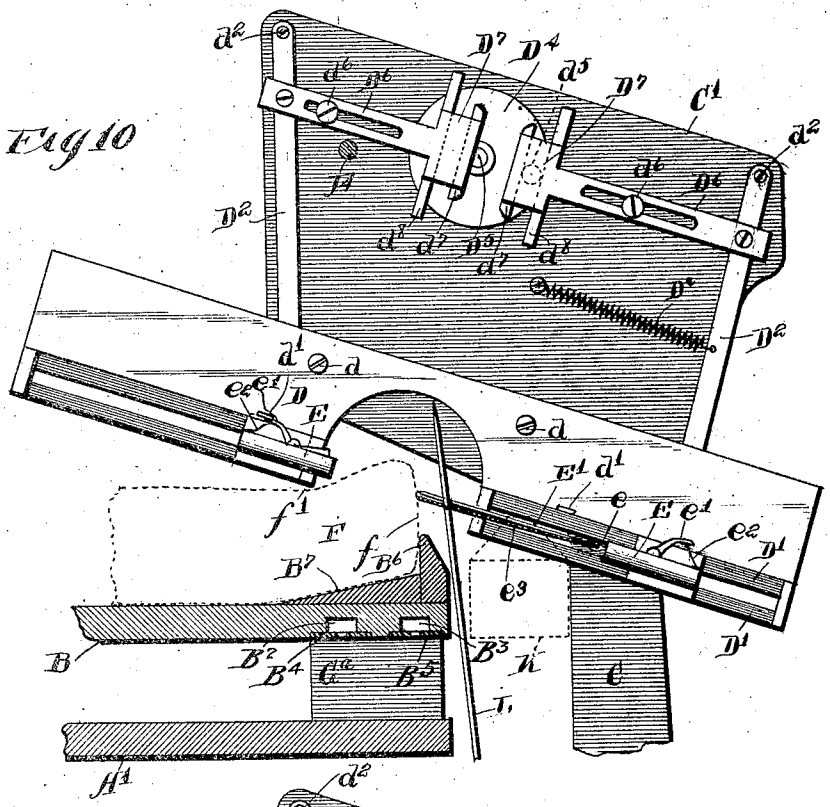


Fig 11

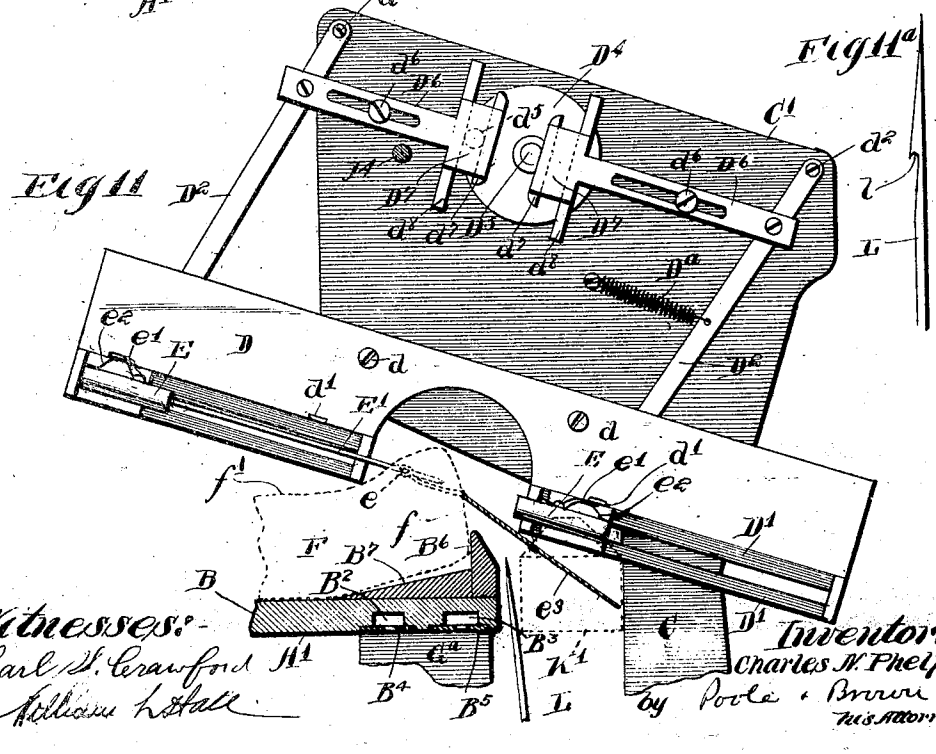


Fig 11a

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No. 810,882. PATENTED JAN. 23, 1906.

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MATTRESS SEWING MACHINE.

APPLICATION FILED AUG. 31, 1901. RENEWED JUNE 15, 1905.

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Fig 12.

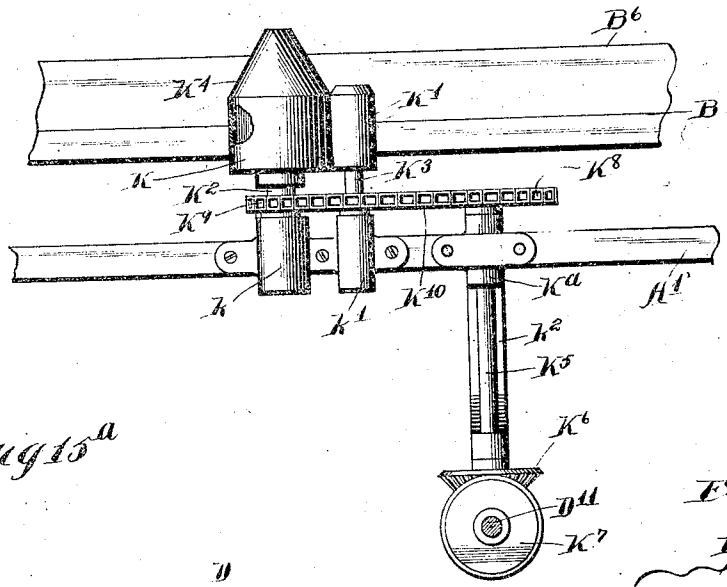


Fig 15a.



Fig 14.

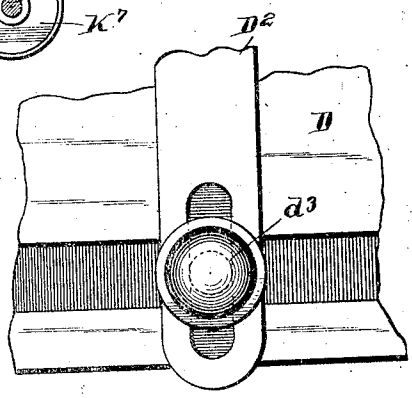


Fig 13.

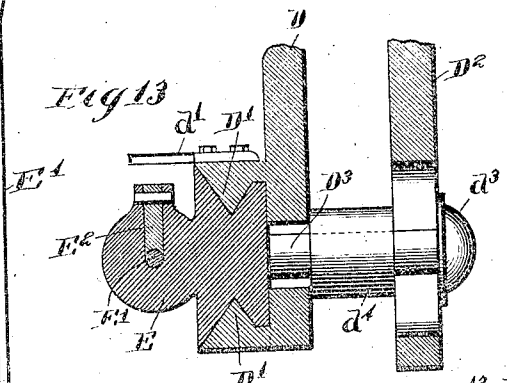
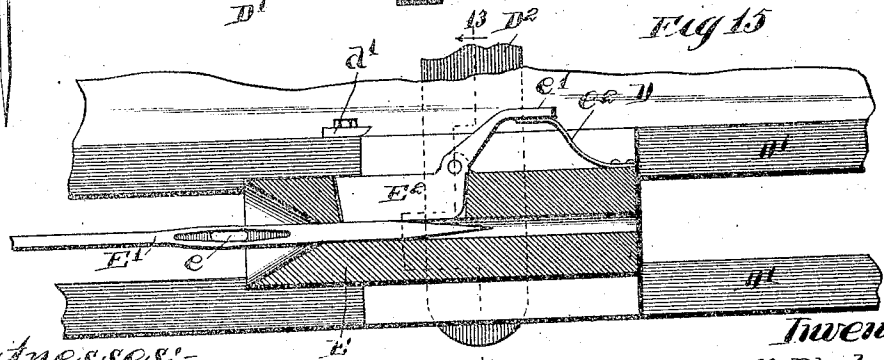


Fig 15.



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APPLICATION FILED AUG. 31, 1901. RENEWED JUNE 15, 1905.

10 SHEETS—SHEET 8.

Fig 16

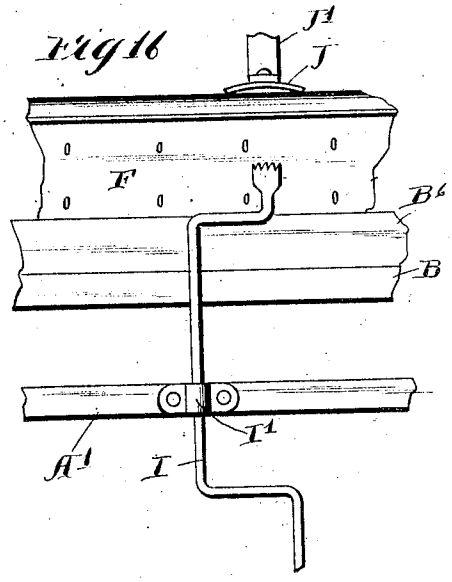


Fig 17

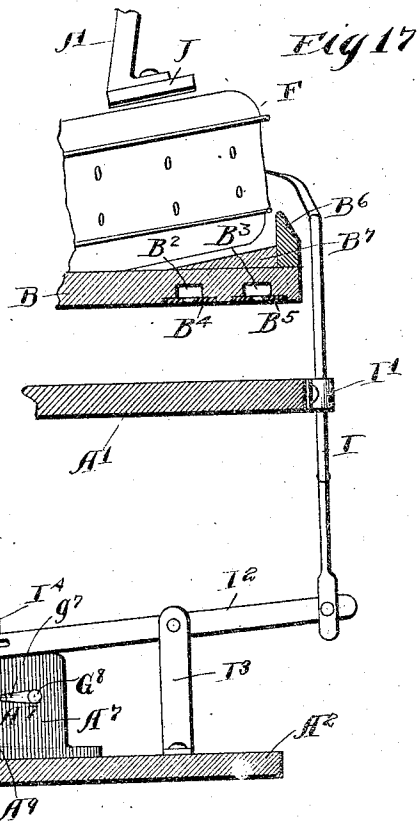


Fig 18

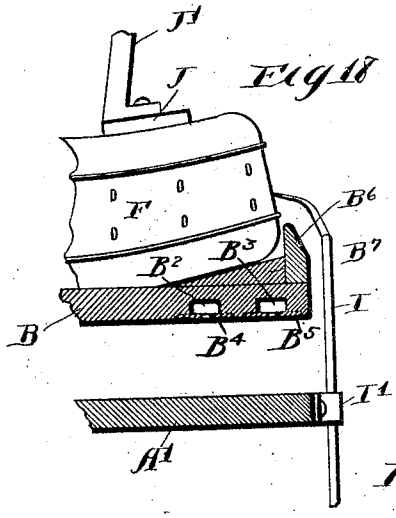


Fig 19

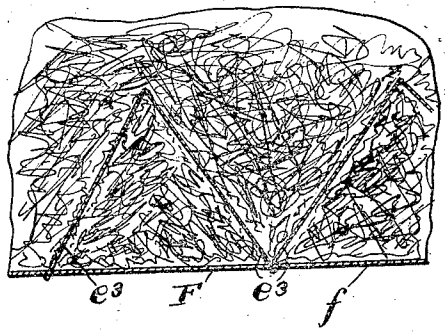


Fig 20



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No. 810,882. PATENTED JAN. 23, 1906.

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MATTRESS SEWING MACHINE.

APPLICATION FILED AUG. 31, 1901. RENEWED JUNE 15, 1905.

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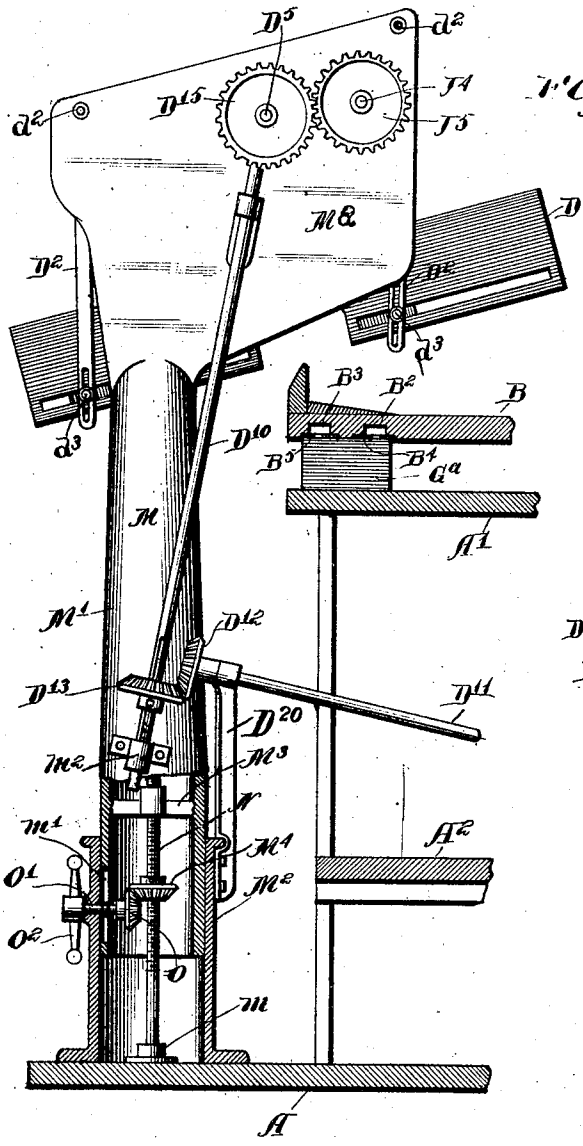


Fig 21

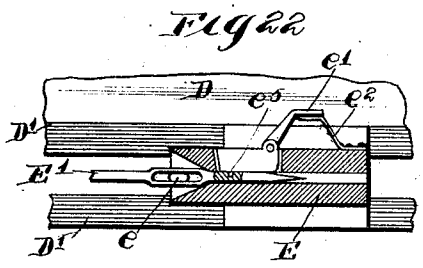


Fig 22

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No. 810,882. PATENTED JAN. 23, 1906.

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MATTRESS SEWING MACHINE.

APPLICATION FILED AUG. 31, 1901. RENEWED JUNE 15, 1905.

10 SHEETS—SHEET 10.

Fig 23

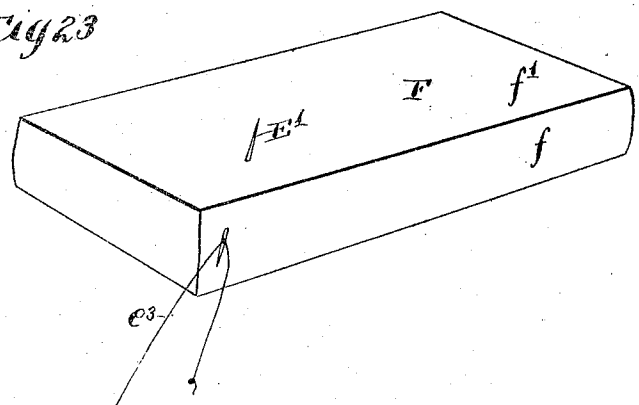


Fig 24

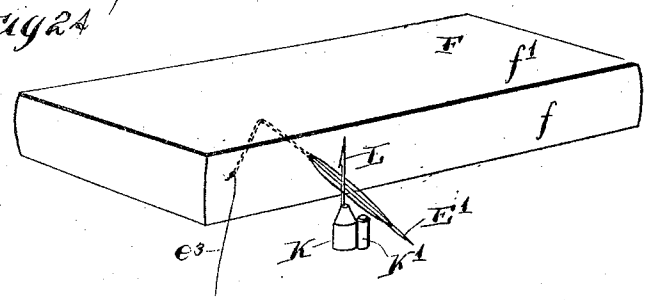


Fig 25

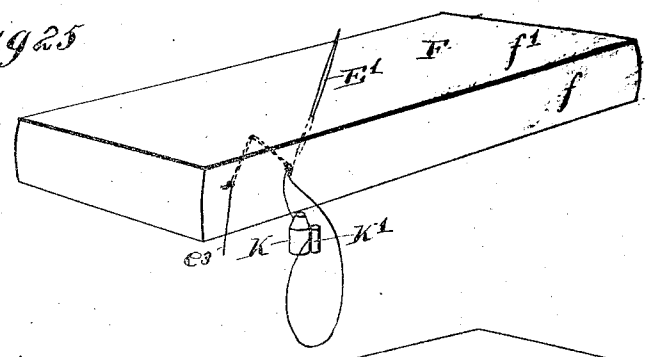
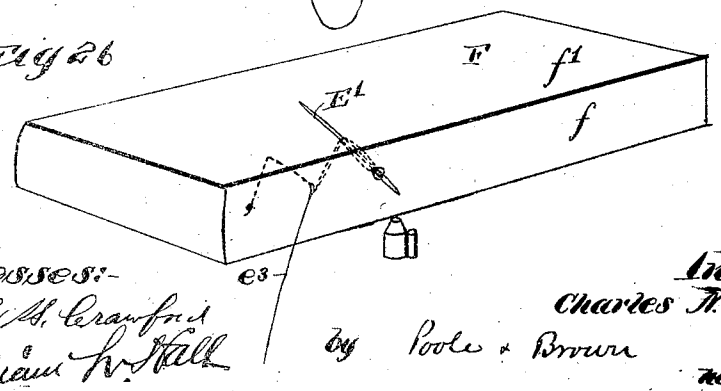


Fig 26



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UNITED STATES PATENT OFFICE.

CHARLES N. PHELPS, OF LAGRANGE, ILLINOIS.

MATTRESS-SEWING MACHINE.

No. 810,882. Specification of Letters Patent. Patented Jan. 23, 1906.

Application filed August 31, 1901. Renewed June 15, 1905. Serial No. 265,432.

To all whom it may concern:

Be it known that I, CHARLES N. PHELPS, of Lagrange, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mattress-Sewing Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a novel sewing-machine designed more particularly for the purpose of "side-stitching" mattresses, cushions, and like articles or stitching the edge sections of mattresses, cushions, and the like to fasten the stuffing material to the edge sections of the mattress or cushion cover or tick.

One of the principal objects of my invention, so far as it relates to the "side-stitching" of mattresses, cushions, and the like, is to provide a machine by the use of which this work, which has heretofore been done by hand, may be automatically accomplished by machinery.

A further object of the invention is to produce a mechanism in a machine for the general purpose specified for giving relative movement to the work-support or table and the needle (and which may be produced by positive oscillatory movement of either of said parts) whereby the proper inclination is given to the stitches and the work is advanced relatively to the needle during the formation of each stitch, thereby producing a continuous running stitch from beginning to the end of the work. The particular mechanism shown herein for producing such movement may be adapted to other uses.

A still further object of the invention is to produce a take-up mechanism for use in sewing-machines constructed to take up or withdraw the slack end of the thread from the work after the formation of each stitch and to draw or tighten the stitches in the work.

My invention has other features and objects, which will more fully appear in the accompanying drawings, to which reference is made.

As shown in said drawings, Figure 1 is a plan view of a machine embodying features constituting my invention. Fig. 2 is a transverse vertical section thereof, taken through the machine at the left side of the needle-actuating mechanism. Fig. 3 is a transverse vertical section of the machine, taken therethrough at the right side of the needle-actuating mechanism. Fig. 4 is a plan section taken on the indirect line 4 4 of Fig. 3. Fig. 5 is a detail section taken on line 5 5 of Fig. 4. Fig. 6 is a detail section taken on line 6 6 of Fig. 4. Fig. 7 is a vertical detail section showing the pins or rods on which the table is oscillated to produce the proper inclination of the stitches and by which the table is given a progressive step-by-step movement. Fig. 8 is a similar view showing the actuating-lever for giving oscillatory motion to said table. Fig. 9 is a fragmentary front elevation showing the parts illustrated in Figs. 7 and 8. Fig. 10 is a side elevation of the machine-head, on which are mounted the needle-guides and the holders and also the mechanism for operating said holders, said view showing the relation of said guides to the work-supporting table. Fig. 11 is a view similar to that of Fig. 10, showing changed positions of the parts illustrated therein. Fig. 11^a is a side elevation of the upper end of the notched rod forming part of the device for taking up the slack end of the thread. Fig. 12 is a fragmentary front elevation of the machine, showing the parts of the take-up mechanism by which the slack end of the thread is drawn from the work. Fig. 13 is a transverse section of the needle guide and holder, taken on line 13 13 of Fig. 15. Fig. 14 is a rear face view of a fragment of said needle-guide. Fig. 15 is a longitudinal section of one of the needle-holders, showing the needle therein and the means for removably securing said needle in the holder and showing also the holder-guide in elevation. Fig. 15^a is a side elevation of the sewing-needle. Fig. 16 is a fragmentary front elevation showing principally the work-table, a mattress thereon, the presser-foot for holding the mattress on the table, and the lifting-rod for lifting the mattress at the beginning of each stitch. Fig. 17 is a transverse section of some of the parts shown in Fig. 16 and illustrating the elevated position of the lifting-rod and also the mechanism for actuating said rod. Fig. 18 is a view similar to that of Fig. 17, showing the lifting-rod in its lowermost position and the mattress held down against the supporting-table. Fig. 19 is an oblique section taken through the mattress, showing the form of stitches produced by the machine. Fig. 20 is a transverse section taken through the mattress to illustrate the position of the

stitches relatively to the edge section of the mattress. Fig. 21 is a view, partly in side elevation and partly in section, of a fragment of a modified form of machine. Fig. 22 is a longitudinal section of a modified form of needle-holder. Figs. 23 to 26 are diagrammatic views illustrating the successive steps of the operation of the needle and take-up device.

The work of "side-stitching" mattresses and cushions has heretofore been done by hand by the use of a double-pointed needle, (illustrated in Fig. 15ª of the drawings herein,) said needle being provided near one end with an eye through which the thread is passed or threaded. After the needle has been threaded one end of the thread is knotted to prevent said end of the thread being drawn through the mattress, and said knotted end of the thread is pulled downwardly away from the needle a sufficient distance to permit the first stitch to be formed before the knotted end of the thread is arrested or drawn tightly against the edge section of the mattress. In beginning the stitch the end of the needle remote from the eye thereof is first passed obliquely upwardly through the edge section of the mattress-tick toward the top section thereof and is also inclined toward the end or side of the mattress in the direction in which the line of stitches is to be formed. The advance end of the needle is passed through the corner of the mattress and out at the top thereof, said needle being advanced until the eye and the looped part of the thread have passed through the stuffing material; but said thread is not carried through the top section of the mattress-tick. The needle is now turned at an opposite inclination with the eye end directed obliquely toward the end of the mattress in the direction in which the line of stitches is to be formed and is repassed downwardly through the stuffing material and out at the edge section of the mattress-tick, said needle being passed entirely through said edge section of the cover and carrying with it the two parts of the thread. After the eye of the needle has emerged from the edge section of the tick in its return movement to complete a stitch the slack or free end of the thread is grasped and pulled through the mattress and the stitch thereby tightened, said stitch, when the slack end of the thread is withdrawn, consisting of a single thread of inverted-V shape, the apex of which is located near the top section of the mattress. This operation is repeated for each stitch, the needle being alternately thrust into and returned from the mattress and the inclination thereof alternating in the entering and return movements to produce a line of zigzag running stitches from the beginning to the end of the work.

As before stated, it is one of the principal objects of the invention to produce a machine for automatically effecting the work described, and said machine herein shown is constructed with two reciprocating needle-holders, one on each side of the work, said holders operating in unison, one holder thrusting the needle through the work from one side thereof and the other holder receiving said needle and returning it through the work to be again delivered to said first holder, and so on, said holders alternately thrusting the needle through the work and the needle being alternately received by and released from said holders, which latter take the place of a sewer's hands in producing the hand-work. Mechanism is also provided for taking up the slack end of the thread to withdraw the same from the work and tighten the stitch at the completion thereof and also for effecting whatever operations that are required to render the machine automatic in its action, as will hereinafter more fully appear.

As shown in the drawings, A designates the horizontal base of the machine.

A′ A² designate upper and lower platforms, respectively, which are supported on standards rising from the base. The lower platform is designed to support a portion of the actuating mechanism of the machine, and the upper horizontal platform supports thereon a movable table B, which latter supports the mattress or other work while the same is being sewed or stitched. Said table B is supported on the platform A′ through the medium of antifriction-roller casters B′, attached to the table and rolling on said platform.

C designates a column or standard rising from the base A and located in front of the platforms A′ A² centrally of the machine. Said column is provided at its upper end with a head C′, to which is attached a needle-guide-supporting plate D and also mechanism for actuating the needle-holders, hereinafter to be described.

A³ designates a main driving-shaft which is mounted in bearing-standards A⁵ A⁶ A⁷, supported on the lower platform A², and from which shaft the various mechanisms hereinafter to be described are driven.

First referring to the construction and operation of the needle supporting and actuating devices, these parts are made as follows: Said needle-guide-supporting plate D is attached by screws *d* to the head and occupies a forwardly and downwardly inclined position on said head. Said plate is provided at its longitudinal center with a downwardly-opening recess into which the work projects, and the needle-holders E are supported in said plate at opposite sides of said recess, as shown in Figs. 10 and 11. Said needle-holders reciprocate in guide-grooves formed between upper and lower lateral flanges D′ D′ on said plate. The parts of said holders occupying said guide-grooves are provided at

their upper and lower edges with retaining-grooves, in which fit triangular ribs on the flanges D′, and the inner faces of said holders bear against the side faces of the plate, as shown in Fig. 13, said parts being thus constructed to afford an ample bearing-surface between the holders and the guides. Said holders are provided with apertures to receive the needle E′, said apertures opening toward each other. Said holders reciprocate toward and from the central recess in the plate D, each holder alternately receiving the needle from the other and on the next inward throw delivering the needle to said other holder. The corner of the mattress or cushion F resting on the table B projects into the downwardly-opening recess in the plate D between the holders, so that as the needle is passed from one holder to the other it passes into or through said mattress and carries the thread with it. The needle (shown in Fig. 15ª) is pointed at both ends and provided near one end with a thread-receiving eye *e*. Said holders are provided with pivoted spring-actuated latches E^2, Figs. 13 and 15, which pass through slots in the holders and are adapted to press at their inner sides against the needles therein, as shown in Fig. 15. Each of said latches is provided with a rigid arm *e′*, which is engaged by a spring e^2, which acts to hold the latch against the needle to lock the latter in the holder. In the reciprocation of the needle-holders one of said holders is moved to the inner end of its guide-groove, thereby passing the needle through the work, and before said holder is retracted the other holder is moved to the inner end of its groove and the free end of the needle, which projects through the work, enters said last-mentioned holder and is locked therein by the latch E^2, the latch of the other holder at this time releasing the other end of the needle. The means for actuating the said latches to release the needle from said holders consists of short rigid arms *d′*, Figs. 10, 11, 13, and 15, attached to the guide-flanges D′ and projecting over the paths of the holders and in position to strike the arms *e′* of the latches E^2 when the holders reach the inner limit of their travel, as shown in Figs. 10 and 11. The ends of the needles may be flattened or made polygonal in cross-section and may further be provided with notches at their ends adapted to be engaged by lugs e^5 on the latches, as shown in Fig. 22. Said needle-holders are reciprocated in their guide-grooves by means of vertically-oscillating levers D^2, which are pivoted at their upper ends to pivot-pins d^2, attached to the head, and are pivotally connected at their lower ends to laterally-directed pins D^3, Figs. 13 and 14, which pass through slots in said levers and guide-slots in the supporting-plate D and are attached rigidly to the holders E. Said levers D^2 are secured to said pivot-pins D^3 between the heads d^3 of said pins and sleeves d^4, surrounding said pins and interposed between the supporting plates and levers. The levers D^2 are actuated to give reciprocatory movement to the holders by the following mechanism:

D^4, Figs. 2, 10, and 11, designates a disk which is affixed rigidly to a rotative shaft D^5, passed transversely through and mounted in bearings in the head C′. Said disk is provided on its inner face with a pin or crank d^5. (Indicated in dotted lines in Figs. 10 and 11.)

D^6 D^6 designate endwise-reciprocatory bars which are pivoted at their outer ends to the oscillatory levers D^2 between the pivots d^2 of said levers and the holders. Said bars are slotted and engage guide-bolts d^6, which are secured to the head, said guide-bolts maintaining said bars in approximately straight paths of travel in the endwise reciprocation thereof. The bars D^6 are provided at their inner ends with grooved heads D^7, which fit against the face of the disk D^4 and the grooves of which face toward the disk and are adapted to be alternately engaged by the crank-pin d^5 of said disk. The grooves in said head are formed between parallel flanges d^7 d^8 on said head, which are disposed at right angles to the bars, and said grooves are located in the path of travel of said pin or crank d^5. When said pin d^5 in its circular path of travel enters one of the grooves, it bears against the longer or outermost flange d^8 and forces the bar D^6 endwise outwardly, thereby oscillating the lever D^2 to carry the connected holder from the inner to the outer end of its guide-groove and away from the work supported on the table B. The retractive movement of the holder continues until the pin has passed half-way through the groove of the head D^7, and in the latter half of the travel of said pin through the groove the pin exerts pressure against the innermost flange d^7 and acts, through the bar D^6 and lever D^2, to reverse the movement of the holder and carry the same, together with the needle, inwardly toward the work. The parts described are so arranged that when one of the holders has been moved to its innermost position and starts the needle through the work and before its retractive movement begins the other holder is moved inwardly to grasp the needle and complete its passage through the work. Said shaft D^5 is provided at its end remote from the disk D^4 with a beveled gear-wheel D^8, Figs. 1 and 3, which meshes with a beveled gear-pinion D^9, affixed to the upper end of a rotative shaft D^{10}, mounted in bearings on the column C and head C′. The shaft D^{10} is driven from the main driving-shaft A^3 of the machine, through the medium of an oblique rotative shaft D^{11}, provided at its forward end with a beveled gear-wheel D^{12}, which meshes with a beveled gear-pinion D^{13} on the lower end of the shaft D^{10}, and the

shaft D^{11} is provided at its rear end with a gear-pinion D^{14}, which meshes with a gear-wheel A^4, affixed to said main driving-shaft, as shown more clearly in Figs. 4 and 6. In order to prevent the lower needle-holder from sliding outwardly away from the inner end of the guide and the work after it has been moved to its innermost position and before the needle is returned thereto by the upper holder, a spring D^a is applied, which tends to maintain said holder in its innermost position. Said spring, as herein shown, consists of a spiral contractile spring which is attached at one end to the lowermost lever D^2 and at its other end to the head, as shown in Figs. 2, 10, and 11.

In the operation of the devices described the needle-holders are given alternate longitudinal reciprocation toward and from the work, one of said holders thrusting the needle through the work from one side thereof and the other holder receiving the needle after the advance end thereof has passed through the work and drawing the same and the thread through the work. Said last-mentioned holder is in turn reversed in its movement, inserts the needle through the work, and delivers the same to the first holder, these operations being repeated until the line of stitching is completed. The line of stitching formed by the thread e^3 is a zigzag running stitch, the thread passing obliquely into the edge section f of the mattress-tick toward the top section f' thereof and at a laterally-oblique angle with respect to the direction of the line of the stitching to be formed. The first half of the stitch terminates short of the top section of the tick and does not pass through said section and is reversed and returns to and through the side section thereof at a divergent angle with respect to the first half of the stitch, each completed stitch having the form of an inverted V, as more clearly shown in Fig. 19. The upward inclination is given to the stitch by reason of the inclination of the needle-guide-supporting plate relatively to the horizontal table. It is obvious, however, that the same result will be produced if the plate be made horizontal and the table inclined, although the arrangement herein shown is a preferred one.

In an automatic machine for accomplishing the side-stitching described it is necessary in order that the needle may enter the work at the proper angle that the work-table B and the needle-supporting mechanism be given relatively oscillatory movement, and it is also necessary in order to present successive parts of the work to the action of the needle to produce a progressive step-by-step movement of the work-table relative to the needle-supporting mechanism. As before stated, so far as the broader aspect of the invention is concerned, such relative oscillatory progressive movements of the work-table and needle may be produced by positive movement of either of said parts. In the present instance, however, I have shown the needle supporting and guiding mechanism as stationary and the needle as reciprocating in a straight line, while the work-supporting table B is given oscillatory movement with respect to the needle in order to give the proper inclination of the needle to the work in forming the stitches, and said table-actuating mechanism is also shown as constructed to give to the table a progressive or step-by-step movement as the stitches are formed. For this purpose I have herein shown the table as arranged to swing or oscillate on two pivot-pins which are laterally separated in a direction transverse to the direction of travel of the table and which are so constructed and actuated that the table oscillates alternately thereon, the table swinging in one direction on one pin and in the other direction on the other pin. Said pins are each clamped to the table at the time the table swings thereon to prevent the table slipping backwardly with respect to its pivot, one pin in each swing of the table being clamped to the table and the other being free. Each pin is therefore clamped to a part of the table in advance of the point of engagement of the pin therewith on which the table is last swung, thereby slightly advancing the table in each oscillation thereof. The particular mechanism herein shown for effecting this result is made as follows: The work-table is provided on its under surface with two continuous parallel downwardly-opening grooves B^2 B^3, which are indicated in dotted lines in Fig. 1 and in full lines in Figs. 2, 3, 7, and 8. Said grooves are parallel with each other and with the side and end margins of the table. Said grooves are covered by means of slotted plates B^4 B^5, which are attached to the under face of said table, the slots in said plates permitting access to the grooves B^2 B^3 of the pivot-pins and other devices for giving oscillatory movement to the table. G G', Fig. 7, designate two laterally-separated pivot-pins on which the table alternately oscillates or swings. Said pins are located one in front of the other and pass upwardly through the forward margin of the upper platform A' of the machine-frame and through a block G^a, interposed between the forward edge of the table and the platform. The upper ends of said pins pass through the slots in the plates B^4 B^5 and are provided with heads g g', which occupy the grooves B^2 B^3. Said pins G G' are yieldingly connected with the opposite ends of a vertically-oscillatory lever G^2, which is pivoted between its ends to a horizontal pivot-pin attached to upright posts or standards G^3, extending between and attached at their upper and lower ends to the upper and lower platforms A' A^2 in the manner shown in Fig. 9. The connections between the said lever

G^2 and the pins are made as follows: Said pins are provided at their lower ends with flanges or disks g^4, on which rest spiral springs G^4, surrounding the lower ends of said pins. g^5 g^6 designate short plates which are apertured and slipped over the pins G G' above the spring G^4 thereon. G^5 G^5 designate inverted loops or clips which are engaged at their central or closed portions with apertures in the ends of the lever G^2. The upper ends of said clips pass on either side of the springs G^4 and through openings in the ends of the plates g^5 g^6, said clips being connected to said plates by nuts in the manner shown in Figs. 7 and 9. The pins G G' and clips G^5 are made of such length that when the lever G^2 is tilted on its pivot in one direction one of said pins will be pulled downwardly to bring the head thereof into contact with and clamped against the associated slotted plate B^4 or B^5, as the case may be, while the other pin will be raised with the head thereof out of contact with its associated slotted plate, as shown in Fig. 7. The springs G^4, interposed between said lever and the heads of the pins, make such pressure a yielding pressure; but said springs will be made of a strength to exert, through the heads of said bolts on the slotted plates, pressure sufficient to prevent said table slipping on the block G^a when it is swung or oscillated on or about said depressed pin. The lever G^2 is provided with a rigid arm G^6, which latter is connected by a link G^7 with a crank g^7, affixed to the end of a rotative shaft G^8, mounted in the bearing-standards A^6 A^7, as shown in Fig. 4, in front of the main shaft A^3. Said shaft G^8 is provided with a gear-wheel G^9, which meshes with a gear-wheel A^8 on the main driving-shaft A^3, as shown in Figs. 3 and 4, and through which mechanism oscillatory motion is imparted from said driving-shaft to the lever G^2. The gear-wheel A^8 on the main driving-shaft, which meshes with the gear-wheel G^9, is mutilated, one-half of its periphery being blank or without gear-teeth, so that said driving-shaft imparts movement to said pivot-pins during but one-half of each rotation of the shaft. Said shaft G^8 is provided just inside the bearing-standard A^7 with a disk G^{10}, Figs. 4 and 5, provided with two peripheral notches, which are adapted to be engaged by a pawl G^{11}, pivotally supported on the standard A^7, said notched disk and pawl preventing backward rotation of said shaft during its periods of rest, and thereby maintaining the clamped relation of said depressed pin with respect to the table. With the construction described when one of the pivot-pins G G' is pulled downwardly, as shown in Fig. 7, the head thereof clamps the associated slotted plate B^4 or B^5 between said head and the filling-block G^a, and if horizontal pressure be at this time applied to said table at one side of said pivot-pin it will cause the table to oscillate about said pivot-pin, the other pin at this time being raised and not interfering with such oscillatory movement. The slots in the plates B^4 B^5 are made wider than the pivot-pins to permit free movement of the table with respect to the pin which is raised at the time said table swings or oscillates. In the next operation of the shifting pivot-pins and actuating mechanism therefor the pin previously depressed is raised and the pin previously raised is depressed, so as to serve as a pivot for the table in the return movement or swing thereof, said pins thus alternately serving as the pivots about which the table is swung. By reason of the fact that the axis of oscillation of the table is shifted in each movement thereof and said table is prevented from slipping during its swinging motion, said table is given a progressive step-by-step movement which continues until the table makes a complete turn or rotation, so as to present all parts of the work to the needle. The mechanism herein shown for imparting such oscillatory movement to the table is made as follows: H, Figs. 2 and 8, designates a vertically oscillatory lever, which is pivoted on a horizontal pivot-pin h in the upper platform A', said lever passing through an opening in said platform and being provided at its upper end with a reduced part which passes through the slot of the innermost plate B^4 and enters the innermost pivot groove B^2. Said lever passes through a guide-bracket H^5, depending from the platform A' and is pivoted at its lower end to an endwise-reciprocating link or bar H', which latter is pivoted at its rear end to the outer end of a crank-arm H^2, Figs. 2 and 4, affixed to a rotative shaft H^3, mounted in the bearing A^7 and a bearing A^c. Said shaft H^3 is provided with a gear-pinion H^4, which meshes with a gear-pinion A^9, affixed to the extreme end of the main driving-shaft A^3, as shown in Figs. 2 and 7. Said gear-pinion A^9 is mutilated, one-half of the periphery thereof being blank, so that said driving-shaft imparts movement to the oscillatory mechanism described during one-half of the rotation of said shaft. This mechanism is so timed with respect to the shifting-pivot mechanism that the lever H is oscillated to swing the table immediately after the shifting-pivot mechanism has been actuated to depress one of the pivot-pins, said two mechanisms operating alternately during each rotation of the driving-shaft. The inner pivot-pin is located approximately in vertical alinement with the upper ends of the stitches as they are formed and the table swings on the innermost pivot-pin when the needle is in its uppermost position and is being repassed through the work. This arrangement is preserved in order to prevent the needle injuring the mattress-tick when the mattress is oscillated at this time, which would be likely to occur if the pivot-pin were

located out of alinement with the upper part of the stitch. After each complete stitch has been formed and prior to the entrance of the needle into the edge section of the mattress to begin the succeeding stitch the mattress is shifted in order to prevent the needle entering said edge section through the same opening through which said needle passed thereout in the completion of the last stitch. Desirably such shifting is effected in a vertical direction, and I have herein shown mechanism for raising the mattress just prior to the beginning of each stitch. This mechanism is shown more clearly in Figs. 2, 3, 4, 16, 17, and 18 and is made as follows: I designates a vertically-reciprocatory lifting-bar, which has sliding engagement between its ends in a looped bracket I′, secured to the front margin of the upper platform A′ of the machine-frame and is provided at its upper end with an inturned head which is roughened or serrated to engage the mattress to afford a firm hold thereon, so that when the bar is lifted the edge of the mattress is raised off the table in the manner shown in Fig. 17. Said bar is given vertically-reciprocatory movement through the medium of an oscillatory lever I^2, which is pivoted between its ends to the upper end of a standard I^3, rising from the platform A^2 at one end to the lower end of said lifting-bar and has slotted connection at its other end with a crank I^4, Figs. 2 and 17, which is attached rigidly to a shaft I^5, located vertically over the driving-shaft, Fig. 5, and which has bearing in the standards A^6 A^7, one end of said shaft extending beyond the bearing A^7 and the crank being attached to said extended end. Said shaft I^5 is rotated by means of a gear-wheel I^6 thereon which meshes with a gear-pinion A^{10} on the driving-shaft A^3. The mechanism described is so timed with respect to the other parts of the machine that the lifting-bar is raised to its uppermost position just prior to the entrance of the needle to the side section of the mattress in forming the first half of a stitch and is depressed to bring said bar into the lowermost position prior to the return of the needle in completing the latter half of the stitch.

The margins of the table are provided with inclosing rails of flanges B^6, which prevent displacement of the mattress or cushion thereon while being stitched, and the upper face of the table is provided just inside said rails with inclined strips B^7, the purpose of which is to throw the outer edges of the mattress upon which the needle acts in a position slightly inclined away from the needle, as shown in Figs. 10, 11, and 18. In order to press that part of the mattress operated upon by the needle firmly against the table at the time the needle is being passed upwardly through the mattress, a presser-foot J is provided which bears upon the upper surface of the mattress adjacent to the edge thereof. The shank J′ of said presser-foot is attached to or formed on the strap J^2 of an eccentric J^3, as more clearly shown in Figs. 1 and 3. Said eccentric is attached to a short shaft J^4, which passes through and has bearing in the head C′, and a bracket *c* extending inwardly from said head. Said shaft J^4 is provided on its end remote from the eccentric with a gear-wheel J^5, Figs. 1 and 3, which meshes with a gear-pinion D^{15}, attached to the outer end of the shaft D^5 at the side of the gear-pinion D^8 thereon. Through the connections described the presser-foot is depressed upon the mattress once during each operation of the machine, such depression occurring at the time the needle is being inserted upwardly through the edge section of the mattress.

Means are provided in connection with the sewing mechanism described for withdrawing or taking up the slack end of the thread as each stitch is formed, it being understood that in forming the first stitch one end of the thread is made tight to the mattress by knotting the said thread in the usual manner, and that after said first stitch is formed the entire length of the slack end of the thread is withdrawn from the mattress. It is desirable that the entire length of the slack end of the thread should be withdrawn or taken up prior to the commencing of the next succeeding stitch, although it is not imperative that the withdrawal be completed at this time by the use of the mechanism herein described, as will hereinafter more fully appear. The length of thread at the beginning of the stitching operation may and desirably will be sufficient to pass entirely around the mattress without renewing the thread, and in such case the length of the slack end of the thread is such as to render it necessary to employ active and prompt means for withdrawing the thread. The length of said slack end of the thread of course becomes gradually less as the stitches are formed. The mechanism herein shown for effecting this part of the operation is as follows: K K′, Figs. 1, 2, 3, and 12, designate two vertically-arranged rollers which rotate on vertical axes and are affixed to the upper ends of shafts K^2 K^3, rotatively mounted in vertical bearings *k k′*, attached to the forward margins of the upper platform A′ of the machine-frame. The roller K is made of considerably greater diameter than the roller K′, and said rollers have peripheral contact throughout the principal parts of their length. Said roller K is made longer than the roller K′, and the upper end K^4 of said roller K, which extends beyond the roller K′, is made conical. The upper end of the roller K′ is also made slightly conical, this arrangement facilitating the passage of the thread downwardly between the rollers by the means to be hereinafter described. Said rollers will desirably be provided with a friction-producing covering,

such as rubber, as indicated in Fig. 12, thereby affording a firm hold on the thread, which is inserted between said rollers by the mechanism hereinafter described. The shaft K^2 is rotated through gear connections with the shaft D^{11}, which latter forms part of the actuating mechanism for the needle-holders hereinbefore described, as follows: K^5 designates a vertical shaft which is mounted at its lower end in a bearing-bracket k^2, depending from the upper platform A′ of the machine-frame, and at its upper end in a bearing k^a, attached to the front margin of said platform. Said shaft K^5 is provided at its lower end with a beveled gear-pinion K^6, which meshes with a beveled gear-pinion K^7, affixed on the shaft D^{11}. The shaft K^5 is provided at its upper end with a sprocket-wheel K^8, Fig. 12, and the shaft K^2 of the larger roller is provided with a smaller sprocket-wheel K^9, and said sprocket-wheels K^8 K^9 are connected by a sprocket-belt K^{10}. With this construction the roller K′ is continuously rotated from the main driving-shaft of the machine, and owing to the size of said roller and to the adjustment of the gear connections which drive the same from the shaft D^{11} a high peripheral speed is imparted to said rollers. The slack end of the thread is drawn between said rollers K K′ at the completion of each stitch by means of a notched drawing-bar L, Figs. 2, 3, 4, 10, 11, and 11^a, which is pointed at its upper end and is provided near said end with a downwardly-opening notch *l*. Said bar when the needle has been withdrawn from the mattress in the completion of the stitch is arranged to rise between the free or slack end of the thread and the needle and to thereafter descend, the notch *l* hooking over the thread in the descent of the bar and pulling said slack end of the thread downwardly between the rollers, said thread being drawn down over the conical part of the larger roller K and by said conical part of the said roller guided between the two rollers. The mechanism for actuating said notched bar L is shown in Figs. 2, 3, 4, and 6, and is made as follows: L′ designates a horizontally-oscillating lever which is pivoted at its forward end to the lower end of said notched bar L and has bearing between its ends in a short upright standard L^2, rising from the lower platform A^2 of the machine-frame. Said lever L′ is bent between its ends to form a straight portion *l′*, disposed generally at right angles to the main part of the lever, and which part *l′* constitutes the bearing part of the lever. The end of the lever remote from the drawing-bar is pivotally connected with the lower end of a link L^3, Fig. 3, and the upper end of said link is pivoted to the forward end of a vertically-oscillatory lever L^4, which latter is pivoted near its rear end upon a horizontal pivot-pin l^2, attached to the upper end of a vertical standard l^3, rising from the platform A^2 of the machine-frame. The rear end of said lever L^4 is adapted for contact with a cam-arm L^5, affixed to the horizontal shaft I^5, which operates the lifting-bar I before described. Said rear end of the lever L^4 is provided with a rigid arm L^6, which extends rearwardly and upwardly therefrom, and to the outer or rear end of said arm is attached one end of a spiral contractile spring L^7, the other end of which spring is attached to a screw-eye l^4, affixed in the lower platform A^2 of the machine-frame. In the operation of this part of the mechanism the drawing-bar L is thrown upwardly into its uppermost position, when the highest part of the cam-arm L^5 is engaged with the rear end of the lever L^4, as shown in Figs. 3 and 6, and when said cam-arm moves out of contact with said lever L^4 the rear end of said lever is depressed by the action of said spring L^7, which acts, through the link L^3 and lever L′, to retract the drawing-bar. The mechanism described is so timed with respect to the needle-holder-actuating mechanism that said notched bar is elevated at the time the needle is withdrawn from the edge section of the mattress in the completion of a stitch, whereby said bar is caused to pass between the withdrawn needle and the slack end of the thread. After said needle has been fully withdrawn the cam-arm L^5 is moved out of contact with the lever L^4 and the spring L^7 acts, through the levers L^4 L′ and link L^3, to retract the drawing-bar. In the downward movement of the bar the notch thereof passes over the slack end of the thread and pulls the same downwardly between the drawing-rollers in the manner before described, said rollers thereafter drawing said slack end of the thread entirely from the mattress, preferably prior to the commencement of the succeeding stitch.

The diagrammatic views Figs. 23, 24, 25, and 26 illustrate the operation of the needle in the formation of the stitches and the action of the take-up device for withdrawing the slack end of the thread. In said figures the mattress is shown as remaining stationary and the needle inclined in order to produce the appropriate inclination of the stitches to the mattress, this being the position assumed by the needle in hand-sewing and also when the needle-actuating mechanism oscillates relative to the work-table. In Fig. 23 the needle is shown as having been passed upwardly through the edge section of the mattress in position to be grasped by the upper needle-holder. (Not shown.) In Fig. 24 the needle is shown in the position it occupies after it has been grasped by the upper holder and has been thrust thereby downwardly through the mattress and has been reëngaged and withdrawn by the lower needle-holder, this operation completing one stitch

with the exception of withdrawing the slack end of the thread. The shorter or knotted end of the thread has by this movement of the needle been drawn tightly against the edge section of the mattress, and said end thereafter remains stationary. In the position of the needle shown in said Fig. 24 the drawing-bar L has passed upwardly between the slack end of the thread and needle and in its retractive movement has drawn the said slack end of the thread downwardly between the drawing-rolls K K′ to draw said slack end of the thread from the mattress. In Fig. 25 the needle is shown as having been again passed upwardly by the lower holder into the mattress to form the first half of another stitch, and while said stitch is being formed the rollers K K′ are drawing the slack end of the thread outwardly. When the needle has completed the second stitch, as shown in Fig. 26, the rollers have completely withdrawn the slack end of the thread from the mattress. Should the thread be not completely withdrawn from the mattress before the completion of the next succeeding stitch, this would not be objectionable, as if the second part of said slack end be engaged with the rollers before the first part were released therefrom the last of said parts to be engaged with the roller would be above the other, and there would be no tendency to become entangled. It is manifest that the construction of the take-up device described—to wit, a device located at one side of the work which operates in connection with a needle which passes through the work alternately from opposite sides thereof and constructed to withdraw or take up the slack end of the thread from one side of the work only—may be applied to machines for operating on other kinds of work, and I do not wish to be limited to the application thereof herein illustrated.

In Fig. 21 is shown a modification of the machine designed to adapt the machine to mattresses of varying vertical thicknesses. To this end the column which supports the needle-actuating mechanism and designated in said figure as M is capable of vertical expansion and contraction. For this purpose said column is shown as being made of an upper and a lower part, (lettered M′ M^2, respectively,) and to the upper end of the part M′ is attached the needle-mechanism-supporting head M^a, corresponding to the head C′, before described. The mechanism for expanding and contracting the column consists in this instance of a vertical screw-shaft N inside of the tubular column, mounted at its lower end in a step-bearing *m* at the base of the lower section M^2. Said shaft passes at its upper end through and has screw-threaded engagement at its upper end with a transverse bar M^3 passing across the lower end of the upper section of the column. Affixed to said shaft between the bar M^3 and bearing *m* is a beveled gear-pinion M^4, which is adapted for engagement by another beveled gear-pinion O, affixed to the inner end of a horizontal shaft O′, which latter passes outside of the column and is provided at its outer end with an actuating-handle O^2. The shaft O has bearing in the wall of the lower section M^2 of the column and passes through a vertical slot *m*′ in the upper section thereof. With this construction rotation of the shaft in one direction will cause the column to be vertically elongated, and rotation thereof in the other direction shortens the column. The gear-wheel D^{13} is shiftable on the shaft D^{10}. The shaft D^{11} has bearing in a bracket D^{20}, attached to the lower section of the telescopic column, whereby said shaft D^{11} and the gear-wheel thereon remain stationary, notwithstanding the vertical adjustment of the upper end of the column, and the gear-wheels D^{12} D^{13} are maintained in meshing relation by sliding the latter wheel longitudinally of the shaft D^{10}.

It will be understood, of course, that the mattress is stitched first on one side and is thereafter reversed and stitched on the other side to produce two rows of stitching. (Shown in Figs. 16, 17, and 18.)

In the foregoing description of the operation of the machine the sections of the mattress-cover which surround the mattress have been referred to and are referred to in the claims as the "edge sections" or the "edge faces," while the upper and lower faces are referred to as the "side" or "top" and "bottom" faces. Such terms have been employed as a convenient means of designating the parts of the cover and to prevent confusion. At the same time the meaning of the technical term "side-stitching" employed by mattress-makers to designate the work for which this machine is especially applicable has not been lost sight of, and the "side" referred to in such technical designation is herein referred to as the "edge" of the mattress. It will be understood, however, that so far as the general operation of my machine is concerned it may be employed to produce stitches of other kinds to fasten the mattress-filling to the mattress-cover.

It is obvious that the various structural details above described may be varied without departing from the spirit of my invention, and I do not wish to be limited to such details except as hereinafter made the subject of specific claims.

I claim as my invention—

1. A mattress-sewing machine comprising two reciprocating needle-holders operating alternately to receive the needle, to thrust one end thereof through the mattress and release the needle, means for supporting the mattress with its side and edge faces oblique to the path of movement of the needle, whereby said needle is passed through the mattress

in a plane oblique to the said side and edge faces thereof, and means for imparting relative oscillatory movement to the needle-holders and the mattress-supporting means, constructed to change the inclination of the path of the needle in said oblique plane relatively to the side and edge faces of the mattress.

2. A mattress-sewing machine comprising two reciprocating needle-holders operating alternately to receive the needle, to thrust one end thereof through the mattress and release the needle, means for supporting the mattress with its side and edge faces oblique to the path of movement of the needle whereby said needle is passed through the mattress in a plane oblique to the side and edge faces thereof, and means for oscillating the supporting means and constructed to change the inclination of the path of the needle in said oblique plane relatively to the side and edge faces of the mattress.

3. A mattress-sewing machine comprising a mattress-support having a surface upon which the mattress is sustained, two reciprocating needle-holders at one side of said support and operating alternately to receive the needle, thrust one end thereof through the mattress and release the needle, said holders being arranged to direct the needle in a path oblique to the mattress-sustaining surface of the support and means for imparting relative oscillatory movement to the support and needle-holders to change the inclination of the path of the needle in said oblique plane relatively to the adjacent edge of the mattress-support.

4. A mattress-sewing machine comprising two reciprocating needle-holders operating alternately to receive the needle, thrust one end thereof through the mattress and release the needle, means for supporting the mattress with the side and edge faces thereof oblique to the path of the needle, whereby the needle is passed through the mattress in a plane oblique to said side and edge faces of the mattress, means whereby one of said holders thrusts the needle with its advance end through the mattress, means whereby the second holder receives the advance end of the needle as it is released from the first holder and draws the needle partly through the mattress, mechanism for imparting relative, oscillatory movement to the mattress-supporting means and needle-holders while one end of the needle is embedded in the mattress and thereby change the inclination of the needle in said oblique plane to the edge face of the mattress, means acting on the second holder to thereafter return the needle through the mattress in a path diverging from its former path, means whereby said needle is thereafter received by the first holder and completely withdrawn from the mattress, and means for producing a further relative oscillation of the mattress-supporting means and needle-holders at the time the needle is completely withdrawn from the mattress, whereby, when the needle is again returned through the mattress, it is returned on a path diverging from its path of last withdrawal.

5. A mattress-sewing machine comprising two reciprocating needle-holders operating alternately to receive the needle, thrust one end thereof through the mattress and release the needle, means for supporting the mattress with the side and edge face thereof oblique to the path of the needle whereby the needle is passed through the mattress in a plane oblique to said side and edge faces of the mattress, and means whereby one of said holders thrusts the needle with its advance end through the mattress, means whereby the second holder receives the advance end of the needle as it is released from the first holder and draws the needle partly through the mattress, mechanism for imparting relative, oscillatory movement to the mattress-supporting means and needle-holders while one end of the needle is embedded in the mattress and thereby change the inclination of the needle in said oblique plane to the edge face of the mattress, means acting on the second holder to thereafter return the needle through the mattress on a path diverging from its former path, means whereby said needle is thereafter received by the first holder and completely withdrawn from the mattress, means for producing a further relative oscillation of the mattress-supporting means and needle-holders at the time the needle is completely withdrawn from the mattress, whereby, when the needle is again returned through the mattress, it is returned on a path diverging from its last path of withdrawal, and a take-up device located at one side of the mattress for drawing the slack portion of the thread through the mattress.

6. A mattress-sewing machine, comprising two reciprocatory needle-holders operating alternately to receive the needle, thrust one end thereof through the mattress and release the needle, means for supporting the mattress with its side and edge faces oblique to the path of the needle, whereby the needle is passed through the mattress in a plane oblique to said side and edge faces, means whereby one of said holders thrusts said needle with its advance end through the mattress, means whereby the second holder receives the advance end of the needle as it is released from the first holder and draws the needle partly through the mattress, means for imparting relative, oscillatory movement to the mattress-support and needle-holders while one end of the needle is embedded in the mattress, the oscillating part swinging on an axis approximately in line with the point at which the needle is so embedded in said mattress, means acting on the second holder

to thereafter return the needle through the mattress on a path diverging from its former path, means whereby the needle is thereafter received by the first holder and completely withdrawn from the mattress, and means for producing a further relative oscillation of the mattress-supporting means and needle-holders, whereby, when the needle is again returned through the mattress it is returned on a path diverging from its last path of withdrawal.

7. A mattress-sewing machine comprising two reciprocatory needle-holders, a mattress-support, the sustaining-surface of which is oblique to the path of the needle, said holders acting alternately to receive the needle thrust one end thereof through the mattress and release the needle, means whereby one of said holders thrusts the needle with its advance end through the mattress, means whereby the second holder receives the advance end of the needle as it is released from the first holder and draws the needle partly through the mattress, mechanism for imparting oscillatory movement to the said mattress-support while one end of the needle is embedded in the mattress and thereby change the inclination of the needle to the edge of the mattress, means acting on the second holder to thereafter return the needle through the mattress on a path diverging from its former path, means whereby said needle is thereafter received by the first holder and completely withdrawn from the mattress, and means for producing a further oscillation of the mattress-support when the needle is withdrawn therefrom, whereby, when the needle is again returned through the mattress, it is returned on a path diverging from its last path of withdrawal.

8. A mattress-sewing machine comprising two reciprocatory needle-holders, a mattress-support the sustaining-surface of which is oblique to the path of the needle, said holders acting alternately to receive the needle, thrust one end thereof through the mattress and release the needle, means whereby one of said holders thrusts the needle with its advance end through the mattress, means whereby the second holder receives the advance end of the needle as it is released from the first holder and draws the needle partly through the mattress, mechanism for imparting oscillatory movement to the said mattress-support, while one end of the needle is embedded in the mattress and thereby changing the inclination of the needle in said oblique plane to the edge face of the mattress, means acting on the second holder to thereafter return the needle through the mattress on a path diverging from its former path, means whereby said needle is thereafter received by the first holder and completely withdrawn from the mattress, means for producing a further oscillation of the mattress-support when the needle is withdrawn therefrom, whereby, when the needle is again returned through the mattress, it is returned on a path diverging from its last path of withdrawal and means coöperating with said support oscillatory mechanism for imparting to the work-support a step-by-step advance movement as it is oscillated.

9. A mattress-side-stitching machine comprising a work-support and a needle, automatic mechanism for inserting the needle through the edge section, the filling and partly through the top section of the mattress on a path transversely oblique to the said edge and top sections of the mattress, means for returning the needle through the mattress and withdrawing it from the side section to complete the stitch, means whereby the angle of the needle and mattress is relatively changed both at the time the needle is embedded in the top section of the mattress at the middle of each stitch and when the needle is withdrawn from the edge section thereof at the end of each stitch and means for imparting a relative step-by-step movement to the mattress and needle whereby are formed blind zigzag stitches, the parts of which are diverged in the general direction of the line of stitches.

10. A mattress-sewing machine comprising a needle-actuating mechanism, a flat work-support upon the top of which the work is supported, and means for imparting oscillatory motion to the support in the plane thereof to give appropriate inclination to the stitches and to advance the work relatively to the needle-actuating mechanism.

11. A mattress-sewing machine comprising a needle-actuating mechanism, a flat work-support upon the top of which the work is supported, and means for imparting to said work-support a combined oscillatory and step-by-step bodily movement in the plane thereof.

12. A machine for the purpose specified comprising a needle-actuating mechanism, a work-support, two pivot-pins located at one side of the support and adjacent to each other and upon which the support alternately swings, said support being movable relatively to the pins, in the direction of travel of the support, and means for imparting oscillatory movement to said support on said pins.

13. A machine for the purpose specified comprising a needle-actuating mechanism, a flat work-support upon the top of which the work is supported, mechanism for advancing said work step by step to present successive parts of the work to the needle, and means operating with said support-actuating mechanism adapted to turn or rotate said support to present all sides or edges of the work thereon to the needle.

14. A mattress-sewing machine compris-

ing a needle-actuating mechanism, a flat work-support upon the top of which the mattress is supported, mechanism for giving oscillatory movement to said support to incline the edge of the mattress to the needle-actuating mechanism, and means operating with said oscillatory mechanism for advancing said support step by step to present successive parts of the work to the needle, said means being designed to turn or rotate said support to present all sides or edges of the work thereon to the needle.

15. A machine for the purpose specified comprising a needle-actuating mechanism, a work-support, two pivot-pins, means for separately locking said pins to the support, one of said pins being released while the other is locked, and means for oscillating said support on each pin when it is locked thereto, said pins being alternately locked to the support as the support swings alternately on said pins.

16. A mattress-sewing machine comprising a needle-actuating mechanism, a flat work-support upon which the mattress is supported, and means for swinging or oscillating said support to impart thereto a progressive step-by-step movement and to incline the mattress to the needle-actuating mechanism comprising two pivot-pins located on one side of the support and adjacent to each other, and upon which the support alternately swings, said pins being separated in a direction transverse to the direction of travel of the support and means for swinging said support.

17. A machine for the purpose specified comprising a needle-actuating mechanism, a work-support, and means for swinging or oscillating said support to impart thereto a progressive step-by-step movement and to incline the support to the needle-actuating mechanism, comprising two pivot-pins, said support being provided with inner and outer parallel grooves into which the ends of said pins extend, and means for alternately swinging said support on said pins.

18. A machine for the purpose specified comprising a needle-actuating mechanism, a work-support, and means for swinging or oscillating said support to impart thereto a progressive step-by-step movement and to incline the support to the needle-actuating mechanism comprising two pivot-pins, said support being provided with inner and outer parallel grooves into which said pins extend, and the support having oscillatory movement alternately on said pins, and means for oscillating said support comprising a lever pivoted between its ends and engaging at one end one of said grooves.

19. A machine for the purpose specified, comprising needle-actuating mechanism, a work-support, said support being provided with two parallel grooves, one located inside the other, two pivot-pins which are separated in a direction transverse to the path of travel of said support, and the ends of which enter said grooves, means for swinging said support alternately on said pins and means for preventing rearward slipping of said support during its swinging movement, whereby in each swing of its movement the support is advanced one step.

20. A machine for the purpose set forth, comprising needle-actuating mechanism, a work-support, said support being provided with two continuous parallel grooves, one located inside the other, two pivot-pins located on a stationary part of the machine and the ends of which enter said grooves, means for swinging said support alternately on said pins, and means for preventing slipping of said support during its swinging movement.

21. A machine for the purpose specified comprising a needle-actuating mechanism, a horizontal work-table provided on its under side with two, inner and outer, parallel grooves, having inwardly-facing lateral shoulders, vertically-movable pivot-pins extending at their upper ends into said grooves, said pins being provided with heads adapted to engage the inwardly-facing shoulders of the grooves, means for alternately depressing each of said pins to clamp its head on the shoulders of its associated groove, while elevating the head of the other pin from the shoulders of its groove, and means for swinging or oscillating said table on said pins.

22. A machine for the purpose specified comprising a needle-actuating mechanism, a work-support and means for swinging or oscillating said support to impart thereto a progressive step-by-step movement, and to give the appropriate inclination to the stitches, comprising two pivot-pins, said table being provided with inner and outer parallel grooves, having inwardly-facing lateral shoulders, heads on said pins in said grooves, means for alternately raising and lowering said pins, an oscillatory lever for giving alternate vertical movement to said pins to clamp the heads thereof against the shoulders in the grooves, yielding connections between said oscillatory lever and the pins and means for swinging or oscillating said table.

23. A machine for the purpose specified comprising a machine-frame having a horizontal platform, a horizontal work-table supported on said platform through the medium of bearing-rollers, a stationary block on the machine-frame on which one side of the table rests, said table being provided on its under side with inner and outer parallel grooves having inwardly-facing lateral shoulders, two laterally-separated upright pivot-pins sliding in said block and extending into said grooves, heads on said pins in said grooves,

means for vertically moving said pins, means for swinging said table alternately on said pins, and a needle-actuating mechanism.

24. A mattress-stitching machine comprising a flat work-table upon the top of which the mattress is supported, a needle-holder guide located at one side of and above the level of said table, said guide being inclined downwardly and outwardly, two needle-holders movable in unison in guides, one at each side of its longitudinal center, said needle-holders being each adapted to receive and hold the needle and to thrust the same through the work, means for oscillating said table in its plane to reversely incline the table to the guide-plate, and means coöperating with the oscillating means for advancing the table step by step.

25. A machine for the purpose specified comprising a horizontal work-table, a needle-holder guide-plate located at one side and above the level of said table, two needle-holders movable in said guide-plate, one on each end of its longitudinal center and each movable toward and from the center thereof, two oscillatory levers pivotally connected with said plate and with said needle-holders, endwise reciprocatory bars pivoted at their outer ends to said levers and provided at their adjacent or inner ends with grooved heads, and a rotative disk provided with an eccentric-pin adapted to alternately pass through the grooves of said heads.

26. A machine for the purpose specified comprising a horizontal work-table, a needle-holder guide-plate located at one side of and above the level of said table, said plate being inclined downwardly and outwardly and provided centrally with a downwardly-opening recess into which the work projects, two needle-holders moving in unison in said plate, one on each side of said recess, each of said holders being adapted to receive and hold the needle and to thrust the same through the work, means for separately locking said needle in said holders, tripping devices for releasing the locking means of one holder at or before the needle is received by the other holder, and means for imparting oscillatory motion to the table in unison with the movement of said needle-holders.

27. A machine for the purpose specified, comprising a double-pointed needle, mechanism for passing the needle through the work alternately from one side thereof to the other, a horizontal work-table, means for imparting oscillatory motion to said table and advancing the table step by step and means for vertically shifting the work on said table at the beginning of each stitch.

28. A machine for the purpose specified comprising a double-pointed needle, mechanism for passing the needle through the work alternately from one side thereof to the other, a horizontal work-table, means for imparting oscillatory motion to said table and advancing the table step by step, and a lifting-bar movable in unison with the needle-actuating mechanism for lifting the work at the beginning of each stitch.

29. The combination with a sewing-machine and its needle, of the class wherein one end of the thread is made fast to the work and the other or slack end is drawn by the needle through the work as the stitches are formed, of a take-up device comprising two coacting rollers between which the thread is drawn from the work.

30. The combination with a sewing-machine and its work, of the class wherein one end of the thread is made fast to the work and the other or slack end is drawn through the work as each stitch is formed, of a take-up device comprising two rollers between which the thread is drawn from the work, and means for drawing the slack portion of the thread from the needle and inserting the same between said rollers.

31. The combination with a sewing-machine and its needle, of the class wherein one end of the thread is made fast to the work and the other or slack end is drawn through the work as the stitches are formed, of a take-up device comprising two rollers between which the thread is drawn from the work, the working faces of said rollers being covered by a yielding, friction-producing material.

32. A machine for the purpose specified comprising a double-pointed needle, mechanism for passing the needle through the work alternately and in reverse directions, and a take-up mechanism comprising two rollers by which the slack portion of the thread is withdrawn from the work, and a drawing-bar adapted to pass between the needle and the slack portion of the thread to effect the introduction of the thread between said rollers.

33. A machine for the purpose specified comprising a double-pointed needle, mechanism for passing the needle through the work alternately and in reverse directions, and a take-up mechanism comprising two rollers by which the slack portion of the thread is withdrawn from the work, and a drawing-bar adapted to pass between the needle and the slack portion of the thread to effect the introduction of said thread between said rollers, said rollers being tapered at their receiving ends.

34. A machine for the purpose specified comprising a work-table, a double-pointed needle, mechanism located at the side of and above the level of the table for passing the needle through the work alternately in reverse directions, mechanism for producing relative oscillatory movement of said support and needle-actuating mechanism, and a yielding presser-foot located near the needle-actu-

ing a needle-actuating mechanism, a flat work-support upon the top of which the mattress is supported, mechanism for giving oscillatory movement to said support to incline the edge of the mattress to the needle-actuating mechanism, and means operating with said oscillatory mechanism for advancing said support step by step to present successive parts of the work to the needle, said means being designed to turn or rotate said support to present all sides or edges of the work thereon to the needle.

15. A machine for the purpose specified comprising a needle-actuating mechanism, a work-support, two pivot-pins, means for separately locking said pins to the support, one of said pins being released while the other is locked, and means for oscillating said support on each pin when it is locked thereto, said pins being alternately locked to the support as the support swings alternately on said pins.

16. A mattress-sewing machine comprising a needle-actuating mechanism, a flat work-support upon which the mattress is supported, and means for swinging or oscillating said support to impart thereto a progressive step-by-step movement and to incline the mattress to the needle-actuating mechanism comprising two pivot-pins located on one side of the support and adjacent to each other, and upon which the support alternately swings, said pins being separated in a direction transverse to the direction of travel of the support and means for swinging said support.

17. A machine for the purpose specified comprising a needle-actuating mechanism, a work-support, and means for swinging or oscillating said support to impart thereto a progressive step-by-step movement and to incline the support to the needle-actuating mechanism, comprising two pivot-pins, said support being provided with inner and outer parallel grooves into which the ends of said pins extend, and means for alternately swinging said support on said pins.

18. A machine for the purpose specified comprising a needle-actuating mechanism, a work-support, and means for swinging or oscillating said support to impart thereto a progressive step-by-step movement and to incline the support to the needle-actuating mechanism comprising two pivot-pins, said support being provided with inner and outer parallel grooves into which said pins extend, and the support having oscillatory movement alternately on said pins, and means for oscillating said support comprising a lever pivoted between its ends and engaging at one end one of said grooves.

19. A machine for the purpose specified, comprising needle-actuating mechanism, a work-support, said support being provided with two parallel grooves, one located inside the other, two pivot-pins which are separated in a direction transverse to the path of travel of said support, and the ends of which enter said grooves, means for swinging said support alternately on said pins and means for preventing rearward slipping of said support during its swinging movement, whereby in each swing of its movement the support is advanced one step.

20. A machine for the purpose set forth, comprising needle-actuating mechanism, a work-support, said support being provided with two continuous parallel grooves, one located inside the other, two pivot-pins located on a stationary part of the machine and the ends of which enter said grooves, means for swinging said support alternately on said pins, and means for preventing slipping of said support during its swinging movement.

21. A machine for the purpose specified comprising a needle-actuating mechanism, a horizontal work-table provided on its under side with two, inner and outer, parallel grooves, having inwardly-facing lateral shoulders, vertically-movable pivot-pins extending at their upper ends into said grooves, said pins being provided with heads adapted to engage the inwardly-facing shoulders of the grooves, means for alternately depressing each of said pins to clamp its head on the shoulders of its associated groove, while elevating the head of the other pin from the shoulders of its groove, and means for swinging or oscillating said table on said pins.

22. A machine for the purpose specified comprising a needle-actuating mechanism, a work-support and means for swinging or oscillating said support to impart thereto a progressive step-by-step movement, and to give the appropriate inclination to the stitches, comprising two pivot-pins, said table being provided with inner and outer parallel grooves, having inwardly-facing lateral shoulders, heads on said pins in said grooves, means for alternately raising and lowering said pins, an oscillatory lever for giving alternate vertical movement to said pins to clamp the heads thereof against the shoulders in the grooves, yielding connections between said oscillatory lever and the pins and means for swinging or oscillating said table.

23. A machine for the purpose specified comprising a machine-frame having a horizontal platform, a horizontal work-table supported on said platform through the medium of bearing-rollers, a stationary block on the machine-frame on which one side of the table rests, said table being provided on its under side with inner and outer parallel grooves having inwardly-facing lateral shoulders, two laterally-separated upright pivot-pins sliding in said block and extending into said grooves, heads on said pins in said grooves,

means for vertically moving said pins, means for swinging said table alternately on said pins, and a needle-actuating mechanism.

24. A mattress-stitching machine comprising a flat work-table upon the top of which the mattress is supported, a needle-holder guide located at one side of and above the level of said table, said guide being inclined downwardly and outwardly, two needle-holders movable in unison in guides, one at each side of its longitudinal center, said needle-holders being each adapted to receive and hold the needle and to thrust the same through the work, means for oscillating said table in its plane to reversely incline the table to the guide-plate, and means coöperating with the oscillating means for advancing the table step by step.

25. A machine for the purpose specified comprising a horizontal work-table, a needle-holder guide-plate located at one side and above the level of said table, two needle-holders movable in said guide-plate, one on each end of its longitudinal center and each movable toward and from the center thereof, two oscillatory levers pivotally connected with said plate and with said needle-holders, endwise reciprocatory bars pivoted at their outer ends to said levers and provided at their adjacent or inner ends with grooved heads, and a rotative disk provided with an eccentric-pin adapted to alternately pass through the grooves of said heads.

26. A machine for the purpose specified comprising a horizontal work-table, a needle-holder guide-plate located at one side of and above the level of said table, said plate being inclined downwardly and outwardly and provided centrally with a downwardly-opening recess into which the work projects, two needle-holders moving in unison in said plate, one on each side of said recess, each of said holders being adapted to receive and hold the needle and to thrust the same through the work, means for separately locking said needle in said holders, tripping devices for releasing the locking means of one holder at or before the needle is received by the other holder, and means for imparting oscillatory motion to the table in unison with the movement of said needle-holders.

27. A machine for the purpose specified, comprising a double-pointed needle, mechanism for passing the needle through the work alternately from one side thereof to the other, a horizontal work-table, means for imparting oscillatory motion to said table and advancing the table step by step and means for vertically shifting the work on said table at the beginning of each stitch.

28. A machine for the purpose specified comprising a double-pointed needle, mechanism for passing the needle through the work alternately from one side thereof to the other, a horizontal work-table, means for imparting oscillatory motion to said table and advancing the table step by step, and a lifting-bar movable in unison with the needle-actuating mechanism for lifting the work at the beginning of each stitch.

29. The combination with a sewing-machine and its needle, of the class wherein one end of the thread is made fast to the work and the other or slack end is drawn by the needle through the work as the stitches are formed, of a take-up device comprising two coacting rollers between which the thread is drawn from the work.

30. The combination with a sewing-machine and its work, of the class wherein one end of the thread is made fast to the work and the other or slack end is drawn through the work as each stitch is formed, of a take-up device comprising two rollers between which the thread is drawn from the work, and means for drawing the slack portion of the thread from the needle and inserting the same between said rollers.

31. The combination with a sewing-machine and its needle, of the class wherein one end of the thread is made fast to the work and the other or slack end is drawn through the work as the stitches are formed, of a take-up device comprising two rollers between which the thread is drawn from the work, the working faces of said rollers being covered by a yielding, friction-producing material.

32. A machine for the purpose specified comprising a double-pointed needle, mechanism for passing the needle through the work alternately and in reverse directions, and a take-up mechanism comprising two rollers by which the slack portion of the thread is withdrawn from the work, and a drawing-bar adapted to pass between the needle and the slack portion of the thread to effect the introduction of the thread between said rollers.

33. A machine for the purpose specified comprising a double-pointed needle, mechanism for passing the needle through the work alternately and in reverse directions, and a take-up mechanism comprising two rollers by which the slack portion of the thread is withdrawn from the work, and a drawing-bar adapted to pass between the needle and the slack portion of the thread to effect the introduction of said thread between said rollers, said rollers being tapered at their receiving ends.

34. A machine for the purpose specified comprising a work-table, a double-pointed needle, mechanism located at the side of and above the level of the table for passing the needle through the work alternately in reverse directions, mechanism for producing relative oscillatory movement of said support and needle-actuating mechanism, and a yielding presser-foot located near the needle-actu-

ating mechanism adapted to press the work toward the table at the beginning of each stitch.

35. A machine for the purpose specified comprising a double-pointed needle, mechanism for passing the needle through the work alternately in reverse directions, a horizontal work-table, means for producing oscillatory movement in said table and advancing the table step by step, a lifting-bar movable in unison with the needle-actuating mechanism for lifting the work at the beginning of each stitch, and a presser-foot located near said lifting-bar and adapted to press the work toward the table when the lifting-bar is in its retracted position.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 24th day of August, A. D. 1901.

CHARLES N. PHELPS.

Witnesses:
WILLIAM L. HALL,
GERTRUDE BRYCE.