

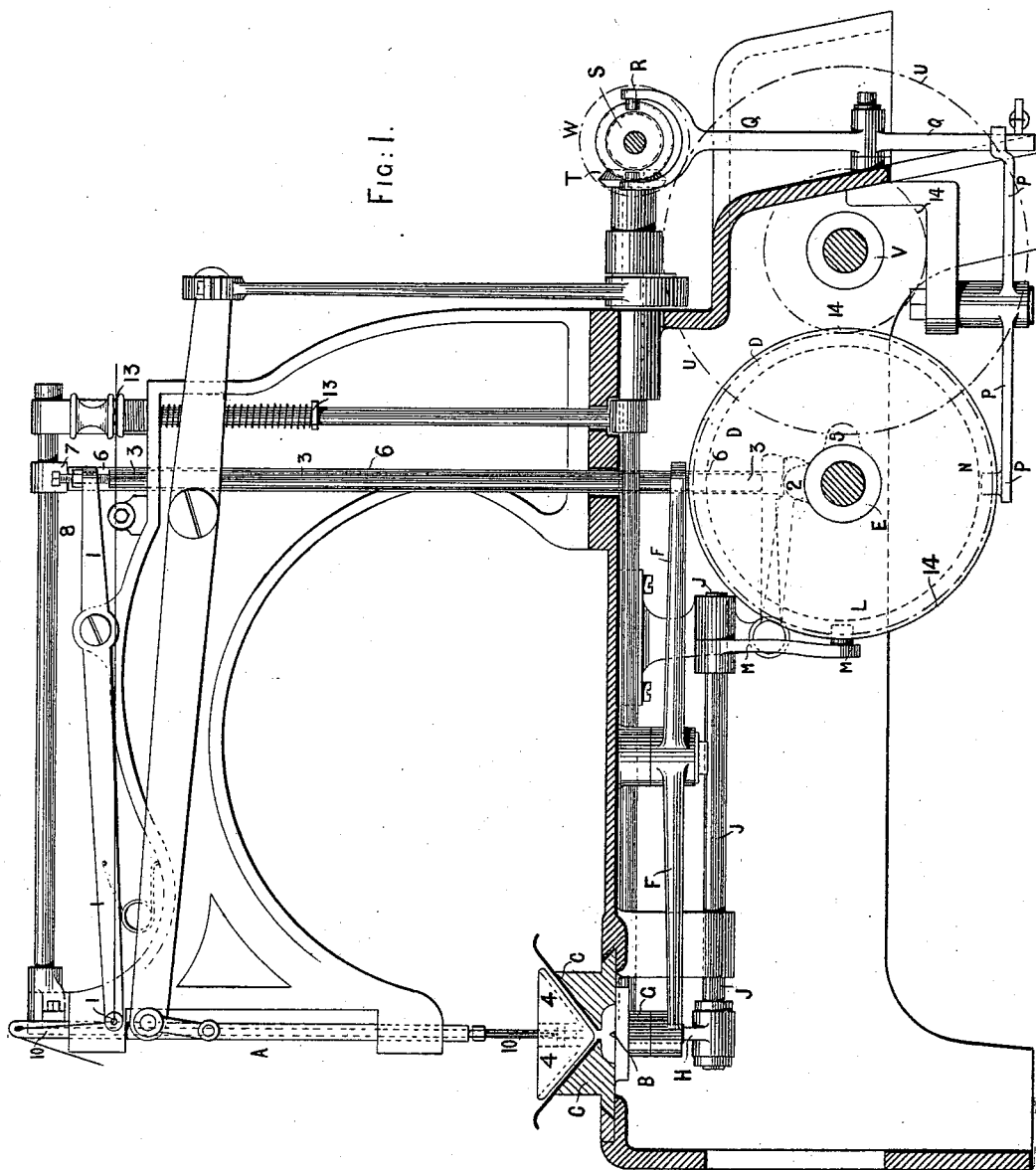
(No Model.)

5 Sheets—Sheet 1.

W. BEECROFT.
MACHINE FOR SEWING BOOKS.

No. 538,478.

Patented Apr. 30, 1895.



Witnesses

Chas. A. Smith
J. Stair

Inventor

Walter Beecroft
per Lemuel W. Senell

(No Model.)

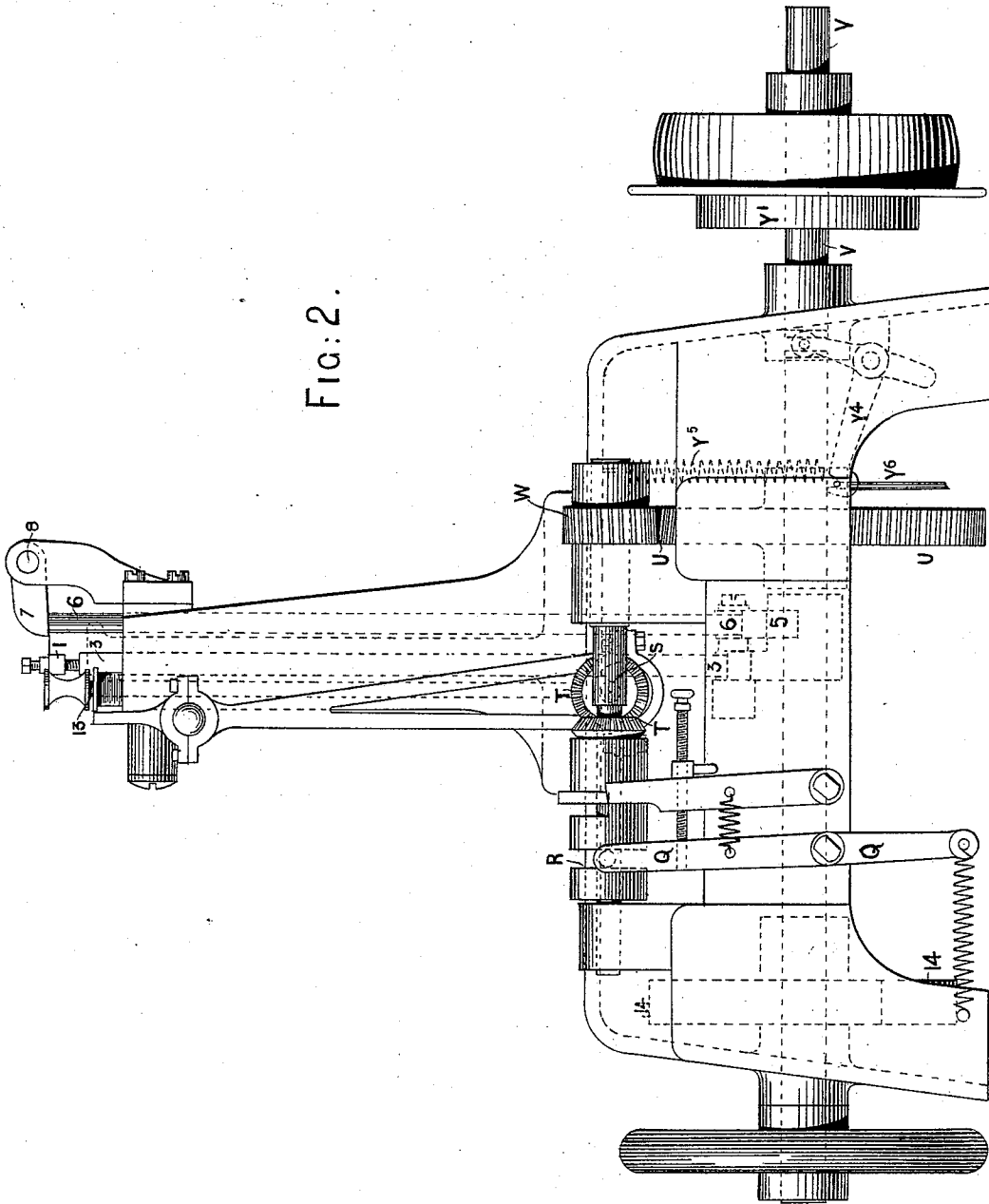
5 Sheets—Sheet 2.

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FIG. 2.



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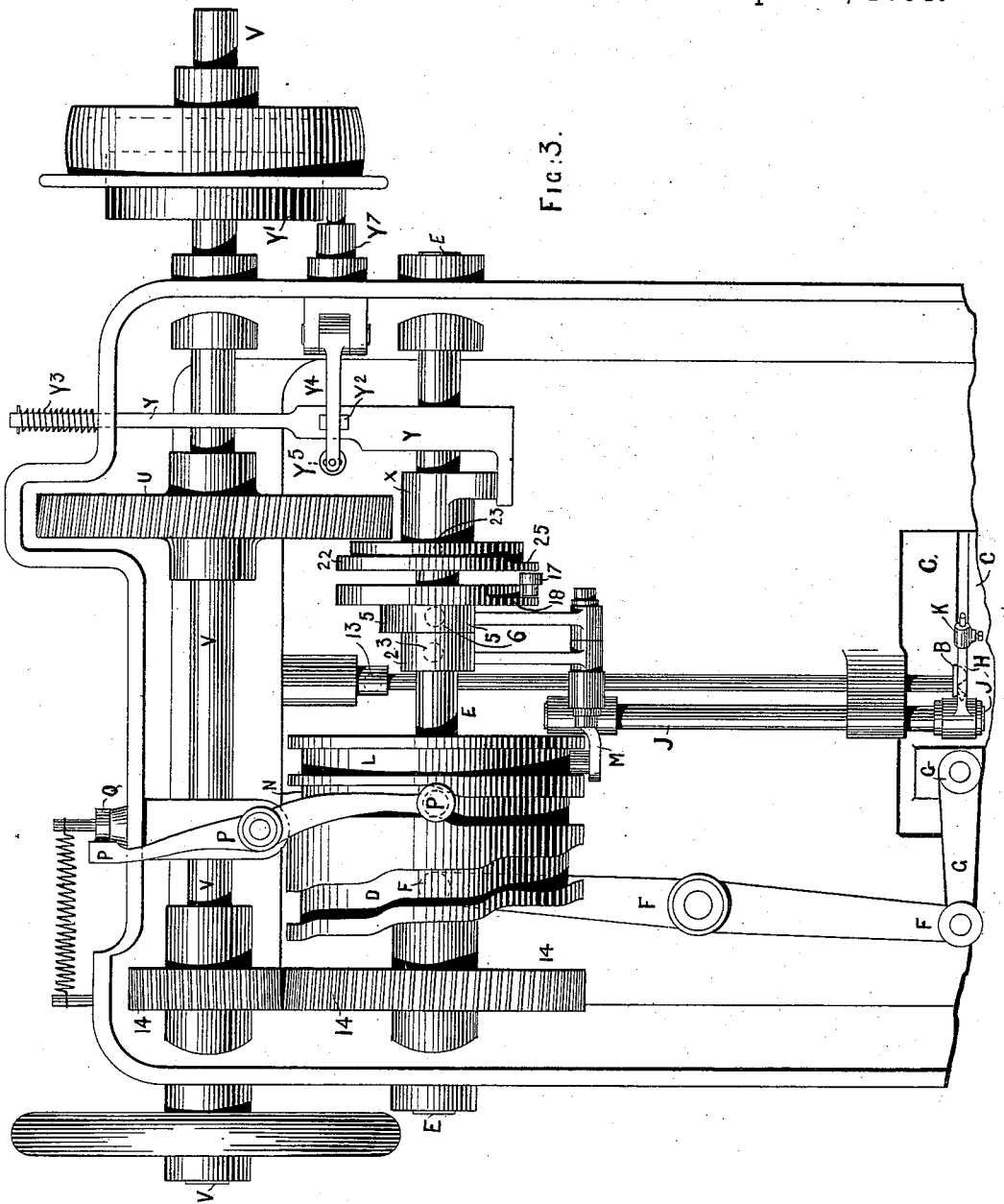
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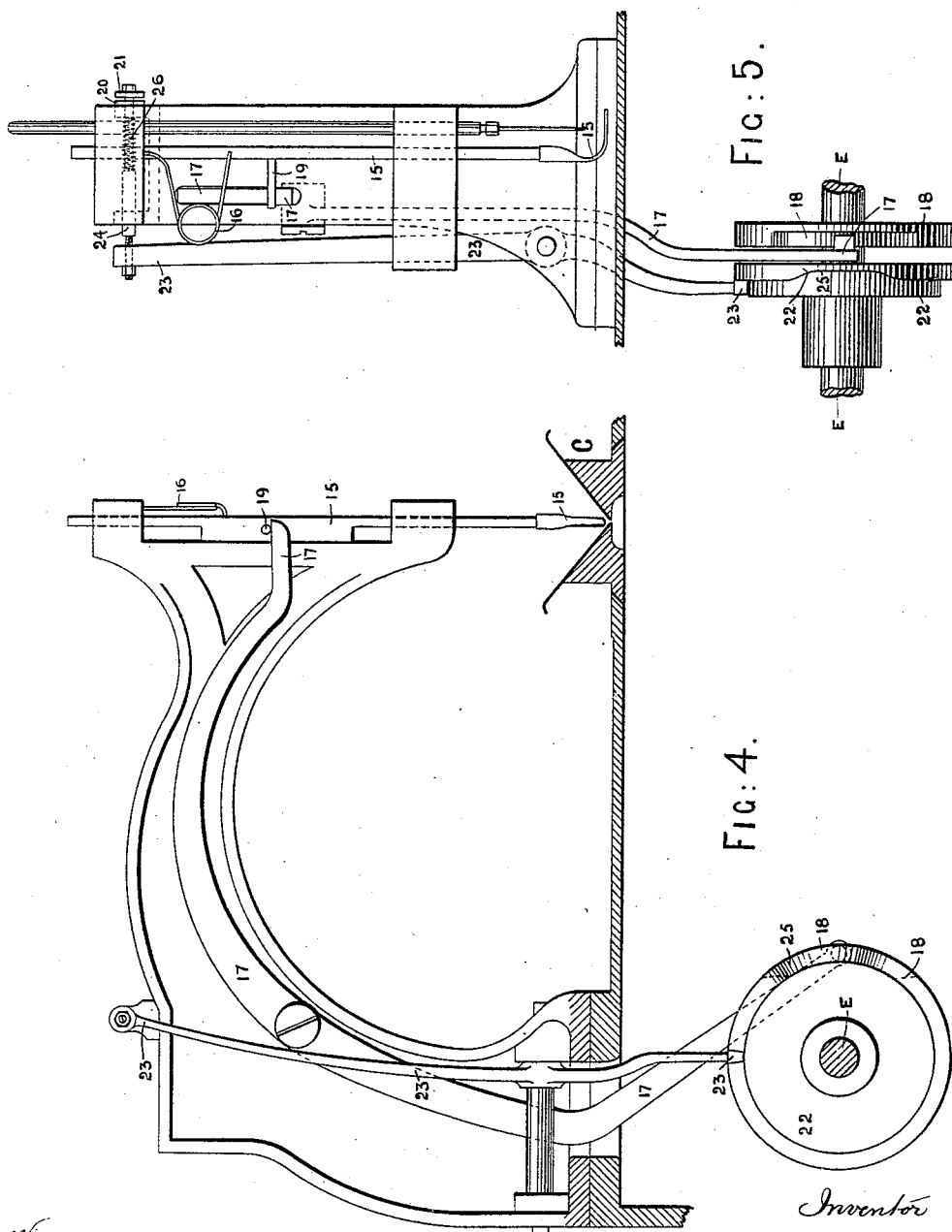
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5 Sheets—Sheet 5.

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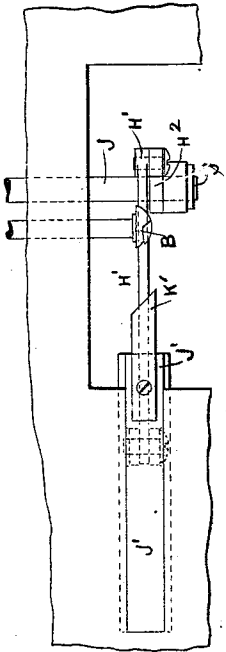


FIG. 8.

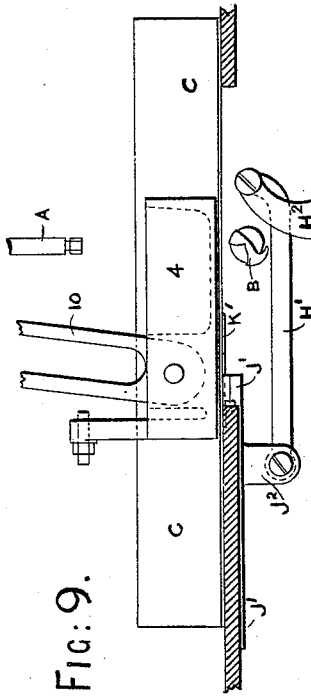


FIG. 9.

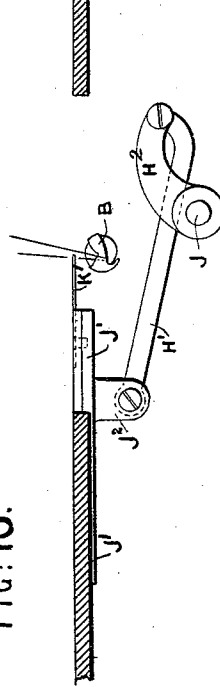


FIG. 10.

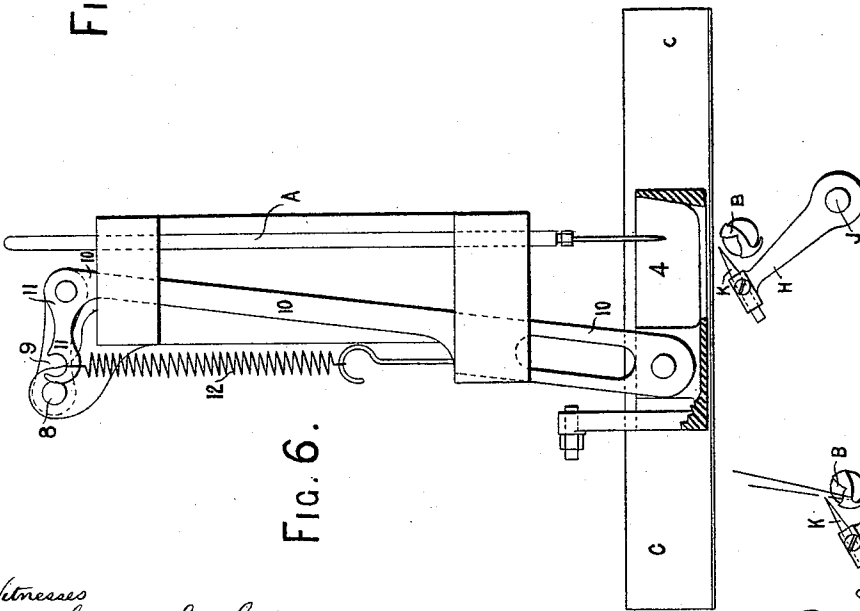


FIG. 6.

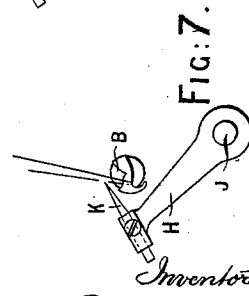


FIG. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

WALTER BEECROFT, OF LEEDS, ENGLAND.

MACHINE FOR SEWING BOOKS.

SPECIFICATION forming part of Letters Patent No. 538,478, dated April 30, 1895.

Application filed July 11, 1892. Serial No. 439,698. (No model.) Patented in England March 24, 1892, No. 5,816.

To all whom it may concern:

Be it known that I, WALTER BEECROFT, a subject of the Queen of Great Britain and Ireland, residing at Leeds, in the county of York, England, have invented new and useful Improvements in Machines for Stitching Books, Pamphlets, Papers, and the Like, (for which a patent has been granted me in Great Britain and Ireland, dated March 24, 1892, No. 5,816,) of which the following is a full, clear, and exact description.

The object of my invention is to construct a machine for stitching books, pamphlets, papers, and the like, and is so arranged as to make any required number of stitches, and then automatically stop and cut off the thread. It may then be started again at a suitable distance from the other sewing or stitches by the attendant, and again produce the required number of stitches, followed by the same cutting off operation and automatic stoppage of machine, and so on, until the full depth of binding is completed.

In order that my invention may be fully understood, reference is given to the accompanying drawings, in which similar letters and numerals refer to like parts in all the figures.

Figure 1 is a right-hand side elevation partly in section. Fig. 2 is an end elevation. Fig. 3 is a partial inverted plan. Fig. 4 is a partial side elevation of the thread-presser mechanism. Fig. 5 is a part front elevation of the same. Fig. 6 is a part front elevation showing presser-plate arrangement. Fig. 7 shows a detail view of the cutting-off knife in operation. Figs. 8 and 9 are respectively a plan and part elevation showing modification of cutting off mechanism, and Fig. 10 shows same in act of cutting off the thread.

I will first describe the various parts of mechanism forming the machine constructed according to my invention, and then proceed to describe the action of the machine during the operations performed in stitching a book, pamphlet, papers, and the like.

For the purpose of my invention, the needle bar A and rotary loop former B are constructed and operated in the ordinary way. Below the needle bar A is provided a horizontal sliding saddle C for receiving the book, pamphlet, papers, or other similar article to be sewed. This sliding saddle C is actuated

by the connecting rod G which is attached to one arm of the lever F, the other arm of which lever F is operated by the external cam D mounted on the shaft E. On the cam D being caused to rotate, the required horizontal sliding movement is given to the saddle C which moves the work along during the stitching operation, such cam D being so constructed that on any required number of stitches being made it causes the saddle C to move back to its starting position.

I employ a movable presser plate 4, for pressing down the book or other papers during the operation of sewing, which presser plate 4 is so arranged as not only to have the required lift motion, but is also arranged so as to move along with the sliding saddle C, and at the end of each set of stitches to spring back from its angular to its vertical position ready for each fresh set of stitches after the cutting off operation (to be hereinafter described) has been performed. The movement for this presser plate 4 is effected by means of the cam 5, which is mounted on the shaft E. Such cam 5 at a given point gives motion to a vertical rod 6 which comes in contact with a suitable projection 7 on the shaft 8, causing such shaft to rock or partially rotate. At the opposite end of this shaft 8 is provided a short connecting piece 9, which is coupled to the lever or rod 10, to which is attached or hung the presser plate 4. To a fixed arm 11 on the said lever or rod 10 I attach a spiral spring 12, which brings the presser plate 4 back to its starting or vertical position.

I construct the thread lever 1 so that it draws down a quantity of slack thread at the end of each set of stitches, so that at the end of each cutting off operation there may be sufficient thread in the needle to commence the next set of stitches. This movement is effected by a projecting cam 2 on the shaft E, which at a given point in the revolution of such shaft, lifts the rod 3, causing the free end of the lever 1 to fall, drawing with it the required quantity of slack thread. The thread passes through end of lever 1 and through upper end of needle bar A as shown at Fig. 1, from whence it passes down to the needle.

The machine is brought to a standstill at the end of each set of stitches by means of

the cam X, which is mounted on the shaft E, such cam X at the required time moving away from and liberating the draw-bar Y which with its projection Y² is pulled forward by means of the spring Y³, thereby allowing the forked bell crank lever Y⁴ to rise, which is effected by the spring Y⁵ attached thereto, causing the pin Y⁷ to move outward and thereby throw the clutch Y' out of gear.

When it is required to restart the machine, the forked bell crank lever Y⁴ is depressed by means of its rod Y⁶ through a treadle arrangement, not shown, thereby withdrawing the clutch Y', and so allow the cam X to move the draw-bar Y until its projection Y² comes against the bell crank lever Y⁴, in which position it is held during the formation of another set of stitches. I employ an external cam N on the aforesaid shaft E for throwing the needle bar A and loop former B in and out of gear. These operations are effected through horizontal double ended lever P and vertical lever Q which actuate the clutch R on the shaft S, throwing in or out of gear such clutch R with the bevel gearing T. Motion is given to the shaft S through wheel U on driving shaft V, and pinion W.

For the purpose of cutting off the thread after any required number of stitches have been produced, I provide an arm H mounted on a shaft J, such arm H carrying the knife or cutting piece K. This cutting off arrangement is brought into operation by means of an external cam L mounted on the shaft E, such cam being so constructed as to transmit motion at the proper time through an arm M, which actuates the shaft J and transmits motion to the cutter K, such cutter being quickly brought into operation, severing the thread as shown at Fig. 7, after the last required stitch has been formed, and after another loop has been taken up by the loop former B, thereby liberating the thread for the next sewing operation.

Instead of the above described arrangement for cutting off the thread after each set of stitches, I may employ the arrangement shown at Figs. 8, 9 and 10, in which I provide the arm H² mounted on the shaft J, such arm being connected to a rod or link H', which is fitted to a slide J' by means of its bracket J², on which slide J' is fixed the cutting off knife K'. On the arm H² being moved by the shaft J at the proper time, motion is given to the slide J' by means of the rod or link H', which slide moves forward in the framework, and carries the cutting off knife K', whereby such cutter K' is brought quickly into operation and severing the thread as shown at Fig. 10.

On starting each set of stitches, and in order to hold the end of the thread during the stitching operation (which is left in the needle after the last cutting off operation) I employ a presser foot 15, which comes onto the end of such thread before the stitching operation commences, thereby holding same firmly, such presser foot 15 being forced down by a

spring 16 which is attached thereto and to the head of the machine. When the set of stitches is completed the presser foot 15 is raised by means of the double ended lever 17, which is operated at the required time by the cam 18 on the shaft E, causing the free end of such lever 17 to come against the pin 19 and lift the presser foot 15, thereby liberating the thread. (See Figs. 4 and 5.) In order to facilitate the cutting of the thread at the end of each set of stitches, I so arrange that the thread shall be drawn or held tightly at that particular time, this being effected by means of two circular disks 20 and 21, which come together at the required time, whereby the thread is held firmly between same, thereby drawing such thread tight at the time when the cutting off knife comes into operation, separating the thread with the greatest possible ease. The disks 20 and 21 are held apart by means of the cam 22 on the shaft E, which cam operates on the double ended lever 23, causing the free end thereof to press against the stud or rod 24, on the end of which is fixed the disk 21. On the cam 22 moving round to the proper place, the lever 23 is allowed to pass into the recess 25, this being effected by the spring 26 which forces outward the stud or rod 24 and with it the lever 23, thereby closing the disks 20 and 21 upon each other with the thread between them, which is held firmly during the cutting off operation. (See Figs. 4 and 5.)

An ordinary tension rod arrangement 13 may be employed to control the thread during the sewing operation.

Motion is transmitted from the driving shaft V to the shaft E which carries the aforesaid cams, by means of the gearing 14.

The operation of the machine is as follows: I take the book, pamphlet, papers, or the like (hereinafter termed the book) and place it in the saddle C between the latter and the presser plate 4, the presser foot 15 being simultaneously therewith brought down onto the end of the thread in the needle, when the treadle is depressed and the machine immediately set in motion. The needle bar A then descends taking with it the needle which passes through the book and forms a stitch in conjunction with the rotary looper B. The needle rising, the saddle C moves along the distance of one stitch taking with it the book and presser plate 4. The saddle C then stops and the needle again descending makes another stitch, and this action of alternate movement of needle and saddle continues until the last stitch of the set is made, when the disks 20 and 21 are now brought together and clamp the thread, thus keeping same tight while the knife K below the looper B comes into operation and severs the thread. The needle bar A and presser foot 15 then rise from the book, and the saddle C and presser plate 4 return to their normal positions, when the machine is brought to a standstill by the clutch Y' being thrown out of gear. I now

advance the book ready for the next set of stitches which are to be made, and once more depress the treadle, when the actions before described are again performed, and at the end of the set of stitches the machine is again thrown out of gear, and so on, until the full depth of binding is completed. Any number of sets of stitches could thus be made, and the number of stitches in a set could be varied by varying the number of "steps" in the hereinbefore mentioned cams.

I am aware that it has been proposed to employ a presser foot co-acting with an under-feed between which devices the work is gripped and by which it is moved forward the distance of one stitch, and then the gripping appliances have been returned to again grip and move along the work, such feed mechanism returning backward after each stitch ready for again carrying the work forward the length of another stitch. In my device the presser plate and traveling saddle do not operate in this manner, but as hereinbefore described.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a machine for sewing folded sheets, of a perforating needle and interlocking thread mechanism, a saddle having double inclined surfaces upon which the folded sheets are laid, a presser plate similarly shaped on its under surface, the saddle and presser plate being slotted longitudinally and in line with the fold in the paper for the passage of the needle, mechanism for moving the saddle and plate endwise and progressively, means for holding the presser plate upon the folded sheets and for lifting the same and other means for returning it to a normal position after the sewing has been completed, substantially as specified.

2. The combination in a machine for sewing folded sheets, of a perforating needle and interlocking thread mechanism, a saddle having double inclined surfaces upon which the folded sheets are laid, a presser plate similarly shaped on its under surface, the saddle and presser plate being slotted longitudinally and in line with the fold in the paper for the passage of the needle, mechanism for moving the saddle and plate endwise and progressively, means for holding the presser plate upon the folded sheets and for lifting the same and other means for returning it to a normal position after the sewing has been completed, a knife and its shaft and actuating means for periodically severing the sewing threads, substantially as set forth.

3. In sewing machines for stitching books, pamphlets, &c., the combination with the vertically moving needle bar A, the rotary looper

B and their actuating mechanism, of the shaft J, the rocking arm M, the actuating cam L, a knife and a carrier therefor connected to and operated by the shaft J for periodically severing the thread, and means for holding the thread while being severed by the knife, substantially as set forth.

4. In sewing machines for stitching books, pamphlets, &c., the combination with the actuating shaft, the presser plate and mechanism for operating the same, of a horizontal work-carrying saddle C for receiving the material to be stitched, parallel guides in the work plate for the saddle C, the connecting rod G, the lever F and the cam D for operating the saddle C by a step-by-step motion in one direction while a given number of stitches are formed by the stitch mechanism, and a spring for returning the saddle by a continuous motion to its normal position after the completion of the said given number of stitches, substantially as set forth.

5. In sewing machines for stitching books, pamphlets, &c., the combination with the actuating shaft, parallel horizontal guides in the work plate, a horizontal sliding saddle in the guides, and mechanism for operating the saddle by a step-by-step motion for a given number of stitches, and then returning same to position by a continuous motion, of a presser plate 4, the rod 10, arm 11 and a spring 12, the connecting arm 9, the shaft 8, projection 7, rod 6 and cam 5, whereby the presser plate 4, after sharing part of the forward motion of the sliding saddle, is raised and returned to a normal position by a continuous motion, substantially as set forth.

6. In sewing machines for stitching books, pamphlets, papers and the like, the combination with the vertically moving needle bar A, the rotary looper B and their actuating mechanism, a sliding work-carrying saddle slotted for the passage of the needle and mechanism for operating the saddle by a step-by-step motion in one direction, while a number of stitches are formed by the stitch mechanism and subsequently returning the saddle to position, and a presser plate passing into the folded sheets and slotted for the passage of the needle, with mechanism for pressing it to the folded sheets and for enabling it to follow the movement of the saddle, of the shaft J, the rocking arm M, the actuating cam L, and a knife K and a carrier therefor connected to and operated by the shaft J for periodically severing the thread, substantially as set forth.

Dated June 25, 1892.

WALTER BEECROFT.

Witnesses:

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JOHN JOWETT.