

No. 742,366.

PATENTED OCT. 27, 1903.

J. J. SULLIVAN & E. B. ALLEN.
THREAD CUTTING DEVICE FOR SEWING MACHINES.

APPLICATION FILED APR. 23, 1903.

NO MODEL

3 SHEETS—SHEET 1.

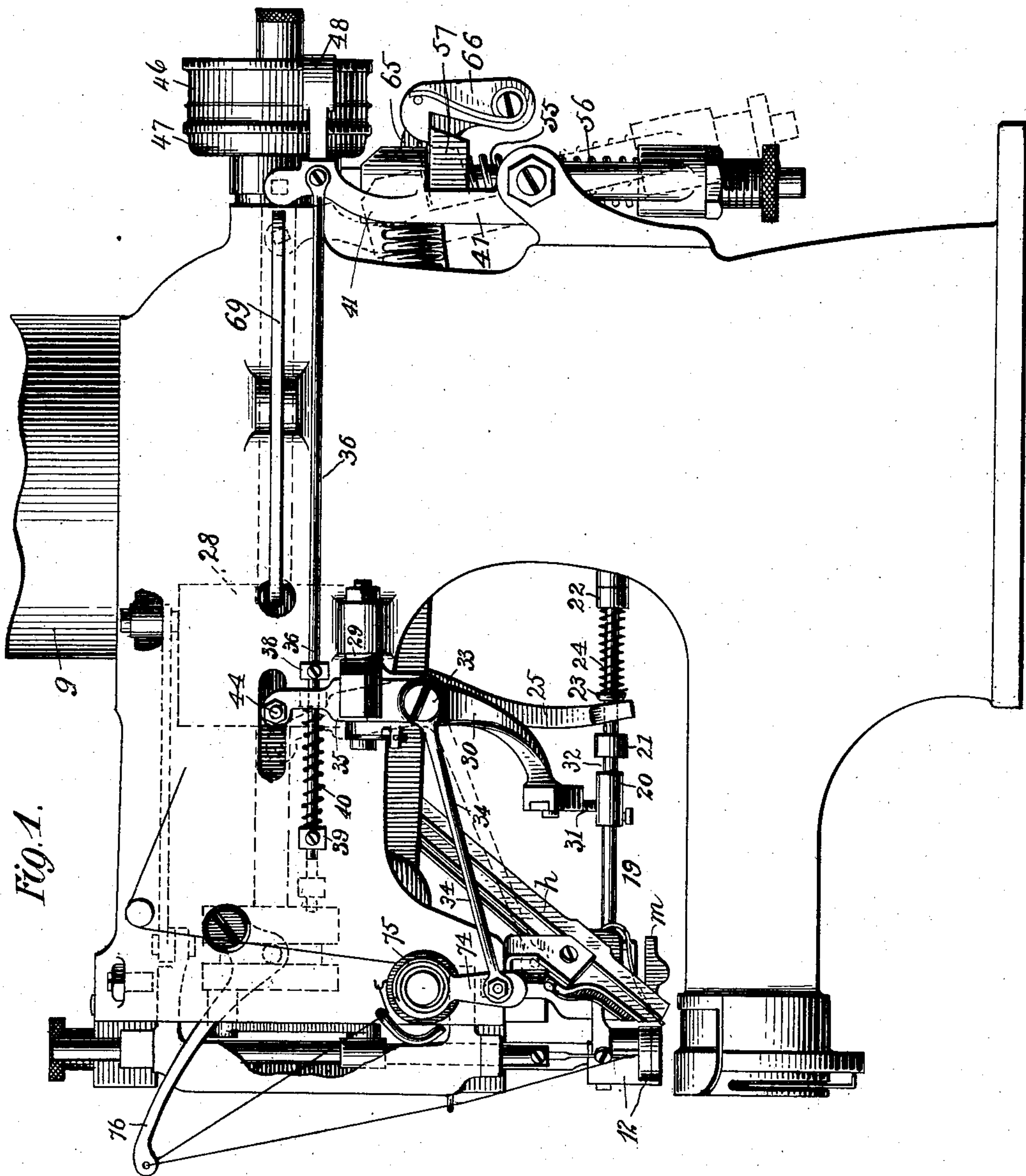


Fig. 1.

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Inventors:
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By Their Attorney, Henry Calver.

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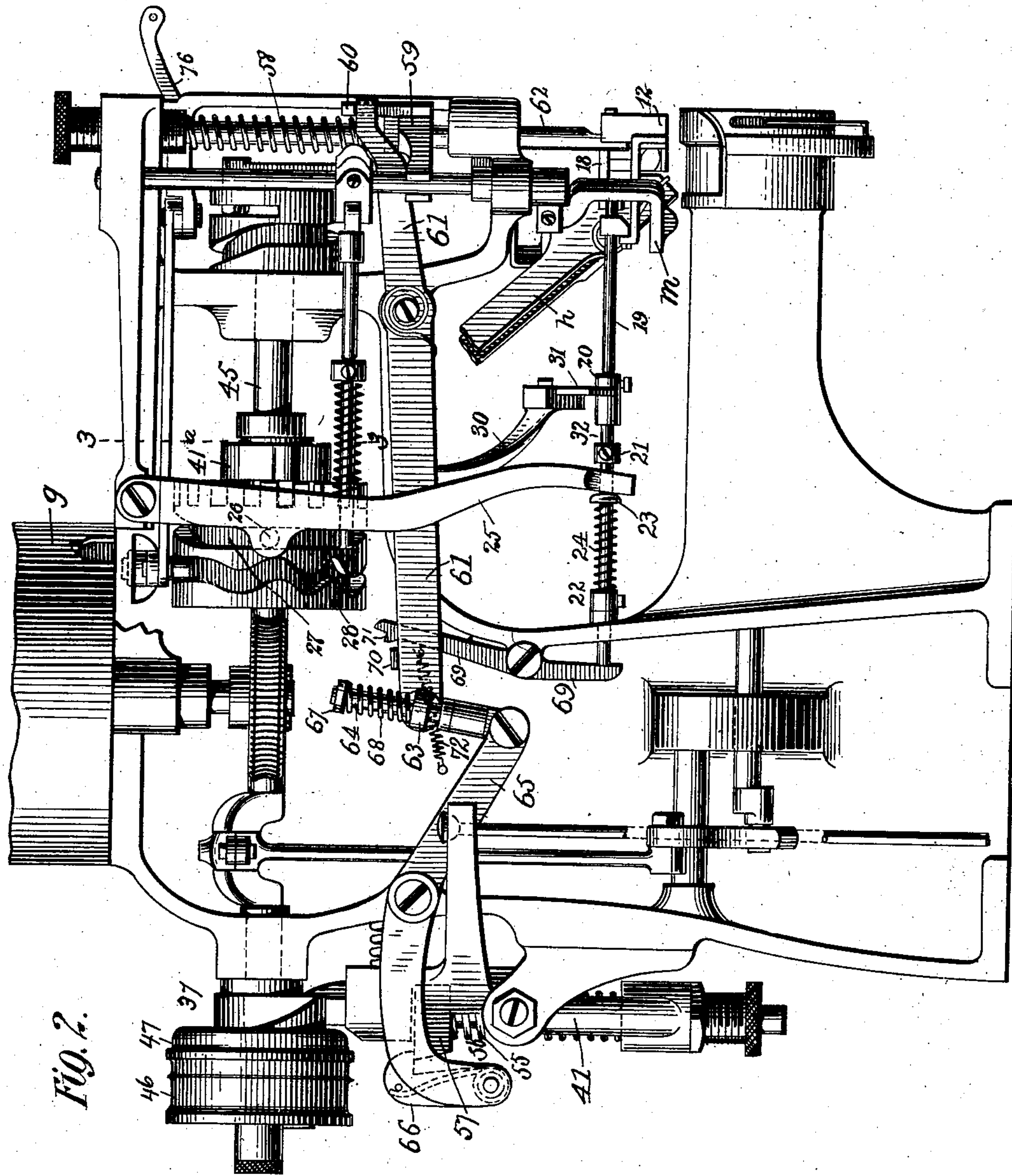
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3 SHEETS—SHEET 2.



Witnesses:
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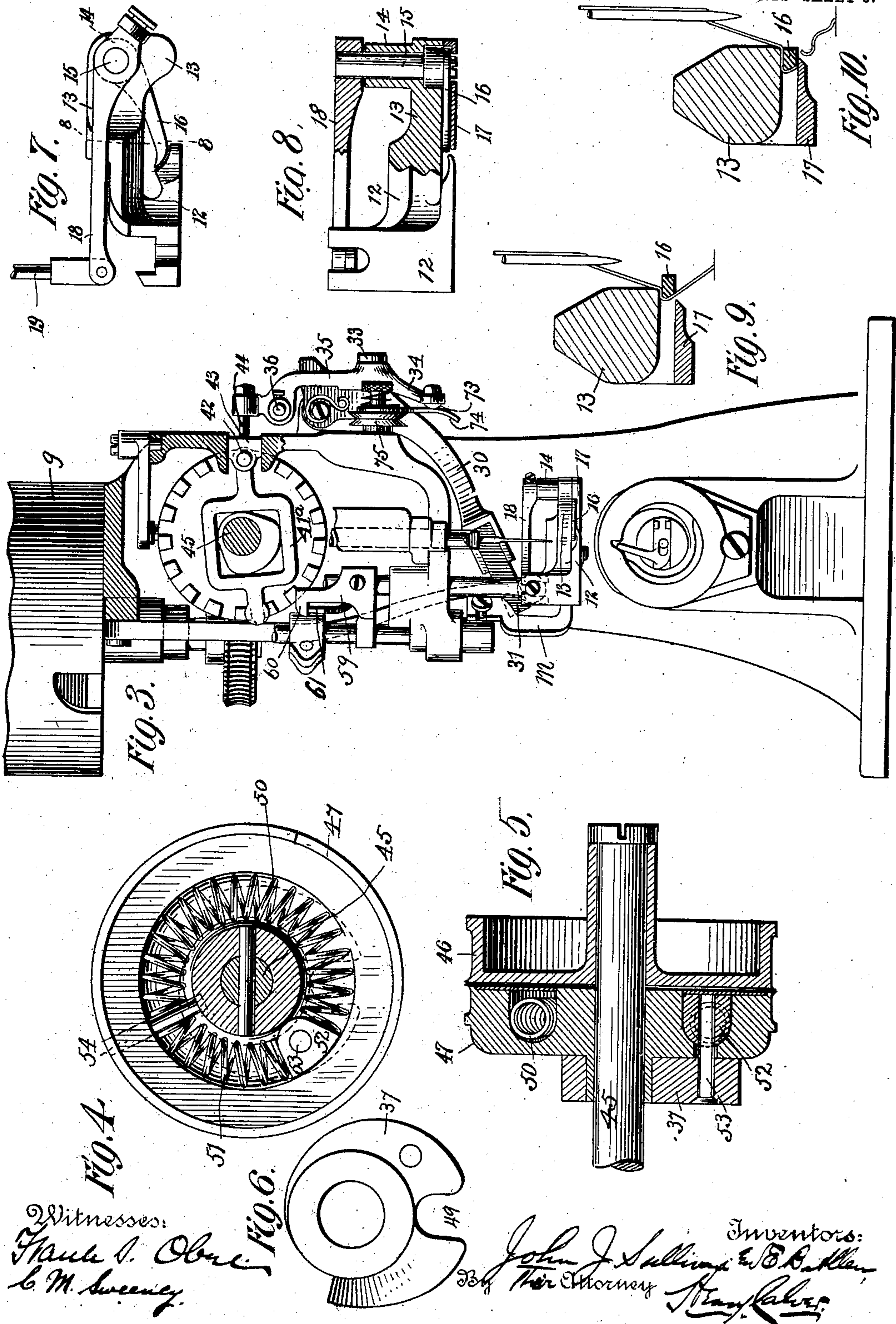
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NO MODEL.

3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

JOHN J. SULLIVAN, OF IPSWICH, MASSACHUSETTS, AND EDWARD B. ALLEN,
OF ELIZABETH, NEW JERSEY, ASSIGNORS TO THE SINGER MANUFACTUR-
ING COMPANY, A CORPORATION OF NEW JERSEY.

THREAD-CUTTING DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters-Patent No. 742,366, dated October 27, 1903.

Application filed April 23, 1903. Serial No. 153,950. (No model.)

To all whom it may concern:

Be it known that we, JOHN J. SULLIVAN, re-
siding at Ipswich, in the county of Essex, State
of Massachusetts, and EDWARD B. ALLEN,
5 residing at Elizabeth, in the county of Union
and State of New Jersey, both citizens of the
United States, have invented certain new and
useful Improvements in Thread-Cutting De-
vices for Sewing-Machines, of which the fol-
10 lowing is a specification, reference being had
therein to the accompanying drawings.

This invention has for its object to provide
an automatic cutting mechanism for severing
the needle-thread close to the work at the
15 completion of a group of a predetermined
number of stitches, as in sewing on buttons,
forming "bars" or "tacks," &c. In this
improved thread-severing mechanism the
knife or cutter is preferably given its thread-
20 severing movement by the stored-up power
of a compressed spring the retaining device
for which is released by connections controlled
from the stop-motion device of the machine,
so that the thread will be severed just as the
25 machine comes to rest.

In the present invention the thread-cutting
device is preferably supported by or mounted
on the presser-foot of the machine, and au-
tomatic means for lifting the presser-foot at
30 the completion of each group of stitches are
also provided. The operations of the thread-
severing and presser-foot-lifting mechanisms
are, however, so timed relative to each other
that the thread will be cut before the presser-
35 foot is lifted, so as to sever the thread as
closely to the work as possible.

The thread-cutting device is preferably so
constructed as to form a nipper which will
hold the end of the thread running to the
40 needle until after the machine shall have
again been started and one or more fastening-
stitches forming part of the next group of
stitches shall have been made in the work,
and to insure a proper thread nipping or
45 holding action the tension on the needle-
thread will preferably be released after the
last stitch of a group of stitches has been
properly tightened by the take-up, but be-
fore the thread-cutter is operated to nip and

sever the thread, and thus the thread will 50
readily yield, so that enough thread will be
drawn down by the movable member of the
cutting device to enable a sufficient length of
thread to extend between the nipping parts,
so that there will be no danger of the end of the 5
thread escaping from the nipping device when
the first stitch of the next group of stitches
is tightened by the take-up.

In the accompanying drawings, Figures 1
and 2 are opposite side elevations of a but- 60
ton-sewing machine embodying the inven-
tion, the button-chute being partly broken
away in Fig. 2. Fig. 3 is a front end view of
the machine with parts broken away in front
of line 3-3, Fig. 2. Figs 4, 5, and 6 are de- 65
tail views of the fast and loose pulleys and
the stop-motion cam. Fig. 7 is a detail plan
view of the presser-foot with the thread-
cutter mounted thereon; and Fig. 8, a partly-
broken-out side view of the same with the 70
cutter closed. Figs. 9 and 10 are enlarged
cross-sectional views of the presser-foot,
illustrative of the thread-cutting and thread-
nipping operations.

The button-sewing machine in connection 75
with which the present invention is herein
illustrated and which machine is provided
with an automatic button-feeding mechan-
ism is essentially the same as that shown and
described in United States Patent No. 596,020, 80
granted December 21, 1897, excepting that
the automatic work-feed is in the present
instance omitted, and the machine herein
shown is provided with a somewhat different
stop-motion device from that shown in said 85
patent, the stop-motion device herein illus-
trated being similar in its operation to that
of United States Patent No. 541,276, granted
June 18, 1895. Only the parts of the present
machine forming a part of or directly con- 90
nected with the thread-cutting mechanism
need therefore be herein described.

Referring to the drawings, 12 denotes the
button-guiding presser-foot, closely adja-
cent to the lower end of the button-chute *h*, 95
extending down from the button-hopper *g*,
and from which chute to said presser-foot the
buttons are conveyed by a button-feeder *m*

at the lower end of a vertical rock-shaft, as in said Patent No. 596,020. The presser-foot 12 is provided with a forwardly-projecting part or extension 13, having a vertical boss 14, in which is journaled a small shaft 15, to the lower end of which the movable member or blade 16 of the thread cutting and holding device is attached, while the stationary cutting blade or member is formed on a plate 17, secured to the bottom of the presser-foot, and between a portion of which presser-foot and plate 17 the movable blade or cutter swings. The cutting edge or part of the blade 16 is formed at the lower side of said blade, while the upper side of the edge of said blade is suitably rounded or left dull, so as to form, in coöperation with the closely-adjacent bottom surface of the presser-foot extension 13, a thread-nipping device which will nip the thread before it is severed by the closing of the movable member or blade 16 and which will hold the end of the thread running to the needle while the said movable member or blade remains closed. The movable member or blade 16 swings across or closely adjacent to the vertical path of the needle, so as to engage the thread which runs from the work to the needle when the latter is lifted.

The cutter-carrying shaft 15 is provided at its upper end with an arm 18, jointed to the forward end of a sliding rod 19, the rear end of which is supported by being passed into a hole formed in a part of the frame of the machine, said rod being provided with three collars 20, 21, and 22 and preferably, also, with a washer 23, between which latter and the collar 22 is interposed a coil cutter-operating spring 24. The rod 19 is embraced by the forked lower end of a lever 25, between which and the spring 24 the washer 23 when used is interposed, or the said spring might impinge directly against said lever if the washer were to be omitted. The lever 25 is provided with a pin or roller-stud 26, entering a cam-groove 27 in the intermittingly-rotating cam-cylinder 28, said lever serving to operate the button-feeder, as in the machine shown and described in United States Patent No. 596,020 above referred to.

Pivotaly mounted on a stud 29, supported by the frame of the machine, is an arm 30, having a finger-piece 31, adapted to enter the notch or space 32 between the collars 20 and 21, and the collar or sleeve 20 is of considerable length and serves at times as a support or rest for the finger-piece 31 when the latter is not in the notch or space 32 and behind the said collar or sleeve 20. Attached to the upper portion of the arm 30 by a pivot-screw 33 is a bell-crank lever comprising the arms 34 and 35. Passing freely through the upper arm 35 is a sliding rod 36, jointed at its rear end to the upper part of the belt-shifting stop-motion lever 41, said rod being provided with two collars 38 and 39 on opposite sides of the arm 35, and a coil-spring 40 is interposed between said collar 39 and said arm.

The cam-cylinder 28 is intermittingly rotated by a lever-dog 41^a, operating in the manner fully described in United States Patent No. 541,840, granted July 2, 1895, and having a horizontal reciprocating movement transverse to the said cylinder, as well as a slight swinging movement on a pivot-screw 42, which attaches a block 43 to said lever-dog, so that said block reciprocates horizontally with said lever-dog. The said block 43 is guided in its horizontal movements in a slot formed in the arm of the machine, and the arm 35 is provided with a pin 44, which at times is brought into the path of movement of said block.

The driving-shaft 45 of the machine is provided with the loose pulley 46 and the fast pulley 47, from one to the other of which a power-transmitting belt will be moved by the belt-shifter 48, carried by the stop-motion lever 41. Mounted loosely on a sleeve of the fast pulley is a cam 37, having a notch 49, said cam being yieldingly connected with said pulley, so as normally to rotate therewith through the springs 50 and 51 on opposite sides of a block 52 on a pin 53, passing through a slot in the face of said fast pulley adjacent to said cam. The springs 50 and 51 are separated from each other by a radial pin 54, rigidly mounted in the fast pulley, said springs being of unequal strength, the spring 51 being the lightest. The stop-motion lever is provided with a vertically-movable rod or plunger 55, yieldingly forced upward by a spring 56, the upper end of which bears against a collar 57, fast on said rod.

The presser-bar 62 is forced yieldingly downward on the work in the usual manner by a spring 58, surrounding said bar, and to the said bar is attached a block 59, having a lip 60 to be engaged by the forward end of a lifting-lever 61, provided at its rear end with an ear 63, through which loosely passes a rod 64, jointed at its lower end to the forward end of a lever 65, pivoted to the frame of the machine, and provided at its rear end with a spring-pressed latch or catch 66. The rod 64 is provided at its upper end with a collar 67, between which and the ear 63 is interposed a stiff coil-spring 68.

When the machine is running and a group of stitches is being formed, the stop-motion lever is held in the position denoted by dotted lines in Fig. 1 by the catch-lever 69, as in said Patent No. 596,020, said catch-lever being tripped to release said stop-motion lever and allow it to assume the position shown in full lines in Fig. 1 by a lug or projection on the cam-cylinder 28, as in said patent. Also when the machine is running the cutting device will be open, as in Fig. 7, the movable cutting-blade being at this time held in its open position by the finger-piece 31 against the stress of the blade-closing or cutter-operating spring 24, said finger-piece at this time resting in the notch or space 32 and behind the sleeve or long collar 20. Also when the machine is

running the collar 38 on the sliding rod 36 bears against the upper arm 35 of the bell-crank lever 34 35 and holds said lever in the position shown in dotted lines in Fig. 1, and in which position the pin 44 in said arm 35 is in a forward position out of the range of movement of the horizontally-reciprocating block 43. Thus when the stop-motion lever 41 is moved toward stopping position the collar 38 is withdrawn from the arm 35, and the spring 40 will move the said arm rearward, bringing the pin 44 against the block 43, so that when said block next moves inward the said spring 40 will move said arm 35 still farther rearward and bring the said pin directly in the path of movement of the said block. With the stop-motion lever in stopping position the cam 37 forces the rod or plunger 55 downward against the stress of its lifting-spring 56, and as said rod or plunger is thus moved downward the collar 57, carried thereby, moves below the hook of the spring-pressed catch or latch 66 on the lever 65. As the full portion of the cam 37 passes the upper end of the rod or plunger 55 said end is forced by the spring 56 into the notch 49 of said cam, thus arresting the movement of the latter; but the yielding cushioning connection of said cam with the fast pulley 47 afforded by the springs 50 and 51 permits a slight additional rotation or movement of said pulley and of the driving-shaft against the stress of the spring 51; but this is resisted by the spring 50, the recoil of which serves to move the driving-shaft backward far enough to cause the block 43 to have at that instant an outward movement against the pin 44, so as to move the arm 30 and lift the finger-piece 31, carried thereby, out of the notch or space 32, thus allowing the coil-spring 24 to move the sliding rod 19 rearward to close the cutting device, so as to nip and sever the needle-thread. When the rod or plunger 55 moves upward to enter the notch 49 in the cam 37, the rear end of the lever 65 is also moved upward by the catch or latch 66, now in engagement with the collar 57 on said rod or plunger, and this upward movement of the rear end of said lever moves the forward end of said lever downward, thus compressing the presser-bar-lifting spring 68, which would now operate the lifting-lever 61 but for the fact that the lifting stress of said spring is momentarily resisted by a latch-lever 69, having near its upper end a shoulder 71, which is beneath a laterally-projecting lug 70 at or near the rear end of the lever 61; but after the sliding rod 19 has been moved rearward far enough to cause the movable member 16 of the thread-cutting device to nip and sever the needle-thread the rear end of said rod strikes against the lower arm of the latch-lever 69 and moves said latch-lever against the stress of its holding-spring 72, so as to disengage the upper end of said latch-lever from the holding-lug 70 on the presser-lifting lever, and thus permit the com-

pressed spring 68 to raise the presser-foot from the work. Thus the needle-thread will be severed close to the work, and after this has been done the presser-foot is automatically lifted to release the work. When the machine is first started for the next stitching operation, the cutting device remains closed until after one or more (preferably two or three) fastenings-stitches have been made in the work, and the lower end of the lever 25 will then move forward in contact with the collar 21, so as to move the sliding rod 19 forward, and thus open the cutting device in readiness for the next cutting operation and also release the thread held nipped in the said cutting device, the button-feeder *m* being in the present machine operated to carry a button to sewing position simultaneously with the opening of the cutting device.

When the upper arm of the bell-crank lever 34 35 is moved rearward by the compressed spring 40 on the rod 36, the forward end of the lower arm of said bell-crank lever is lifted to bring said forward end, or a small lug or button 73 carried thereby, against a releasing-arm 74 of the tension device 75, through which passes the thread running to the take-up lever 76, and thence to the needle. Thus the tension on the needle-thread will be released, so that when the movable member or blade 16 of the thread nipping and severing device is closed it freely draws down sufficient thread, so that an end of suitable length will be held by the thread-nipper, and thus any danger of the accidental escape of the end of the thread from the thread-nipper at the commencement of the next stitch-forming operation will be avoided.

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

1. In a sewing-machine, the combination with a presser-foot, and a thread-severing and a thread-holding device mounted in said presser-foot, of automatic means for closing said thread severing and holding device, to cause it to sever and nip the thread, and an automatic presser-foot-lifting mechanism timed to raise the presser-foot and release the work after the thread has been severed and while it is still held by the severing and nipping device.

2. In a sewing-machine, the combination with a presser-foot, and a thread-severing and a thread-holding device mounted in said presser-foot, of automatic means for closing and opening said thread severing and holding device, to cause it to sever, nip and release the thread, and an automatic presser-foot-lifting mechanism timed to raise the presser-foot and release the work after the thread has been severed and while it is still held by the severing and nipping device.

3. In a sewing-machine, the combination with a presser-foot, and a thread-severing and a thread-holding device mounted in said presser-foot, of automatic means for closing said thread severing and holding device, to

cause it to sever and nip the thread, an automatic presser-foot-lifting mechanism timed to raise the presser-foot and release the work after the thread has been severed and while it is still held by the severing and nipping device, and an automatic stop-motion mechanism by which, after a group of a predetermined number of stitches has been formed, the machine will be stopped.

4. In a sewing-machine, the combination with a presser-foot, and a thread-severing and a thread-holding device mounted in said presser-foot, of automatic means for closing and opening said thread severing and holding device, to cause it to sever, nip and release the thread, an automatic presser-foot-lifting mechanism timed to raise the presser-foot and release the work after the thread has been severed and while it is still held by the severing and nipping device, and an automatic stop-motion mechanism by which, after a group of a predetermined number of stitches has been formed the machine will be stopped.

5. In a sewing-machine, the combination with a thread severing and holding device, and an operating mechanism therefor, of a presser-foot and an automatic presser-foot-lifting mechanism the timing of which is controlled by said operating mechanism for said severing and holding device, so that after the latter has been closed, to sever and nip the thread, the said presser-foot will be automatically lifted.

6. In a sewing-machine, the combination with a presser-foot, of a thread severing and holding device mounted thereon, a reciprocating part for closing and opening the movable member of the said severing and holding device, and an automatic presser-foot-lifting mechanism comprising a controlling device to prevent the presser-foot from being raised and which controlling device is tripped by said reciprocating part and after the latter has closed the severing device to sever and nip the thread.

7. In a sewing-machine, the combination with a thread severing and holding device comprising a movable thread-severing member and a stationary member between which and said movable thread-severing member the thread is nipped and held, of a tension device through which the thread to be severed and held passes, and a tension-releasing device actuated to release the tension on the thread before the thread severing and hold-

ing device is closed, so that thread may be freely drawn to the said thread severing and holding device by the said movable member.

8. In a sewing-machine, the combination with a thread severing and holding device mounted on the presser-foot of the machine and comprising a movable thread severing and nipping member, of a tension device through which the thread to be severed and held passes, a tension-releasing device actuated to release the tension on the thread before the thread severing and holding device is closed, so that thread may be freely drawn to the said thread severing and holding device by the said movable member, and an automatic presser-foot-lifting mechanism timed to lift the presser-foot after the thread has been severed.

9. In a button-sewing machine, the combination with an automatic button-feeding mechanism, of an automatic thread severing and holding device arranged above the work-support, and an automatic tension-releasing device by which the tension on the thread running to the said severing and holding device is released before the said thread severing and holding device is closed.

10. In a button-sewing machine, the combination with an automatic button-feeding mechanism, of a presser-foot, an automatic thread severing and holding device mounted on said presser-foot and an automatic presser-foot-lifting mechanism timed to lift said presser-foot after the said thread severing and holding device has been closed.

11. In a button-sewing machine, the combination with an automatic button-feeding mechanism, of a presser-foot, an automatic thread severing and holding device mounted on said presser-foot, an automatic presser-foot-lifting mechanism timed to lift said presser-foot after the said thread severing and holding device has been closed, and a tension-releasing device timed to release the tension on the thread running to said severing and holding device before the latter is closed.

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

JOHN J. SULLIVAN.
EDWARD B. ALLEN.

Witnesses:

H. J. MILLER,
H. A. KORNEMANN.