

(No Model.)

8 Sheets—Sheet 1.

E. B. ALLEN.
SEWING MACHINE.

No. 524,996.

Patented Aug. 28, 1894.

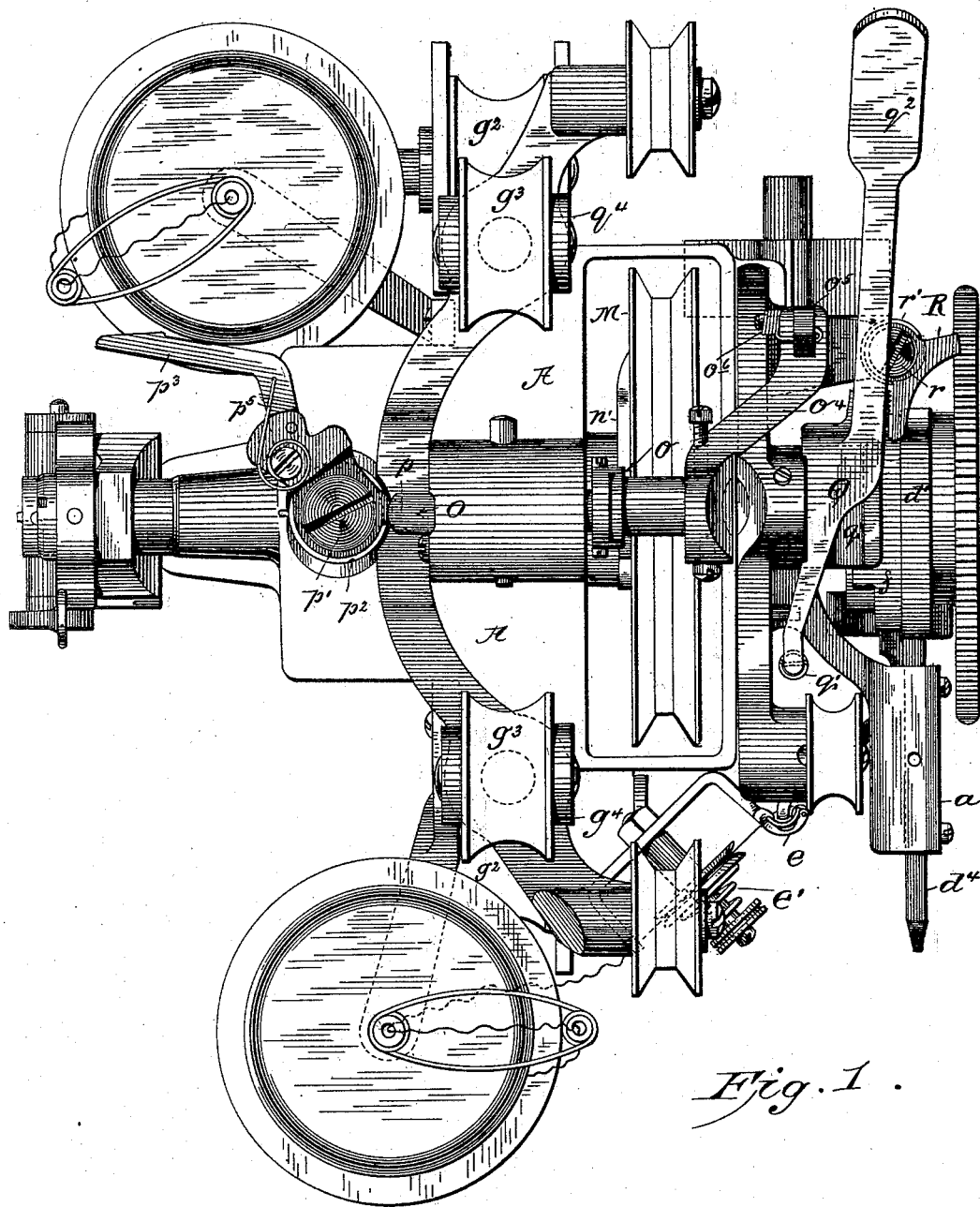


Fig. 1.

Attest
C. W. Benjamin
Notary Public

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by Henry Falver
att'y.

(No Model.)

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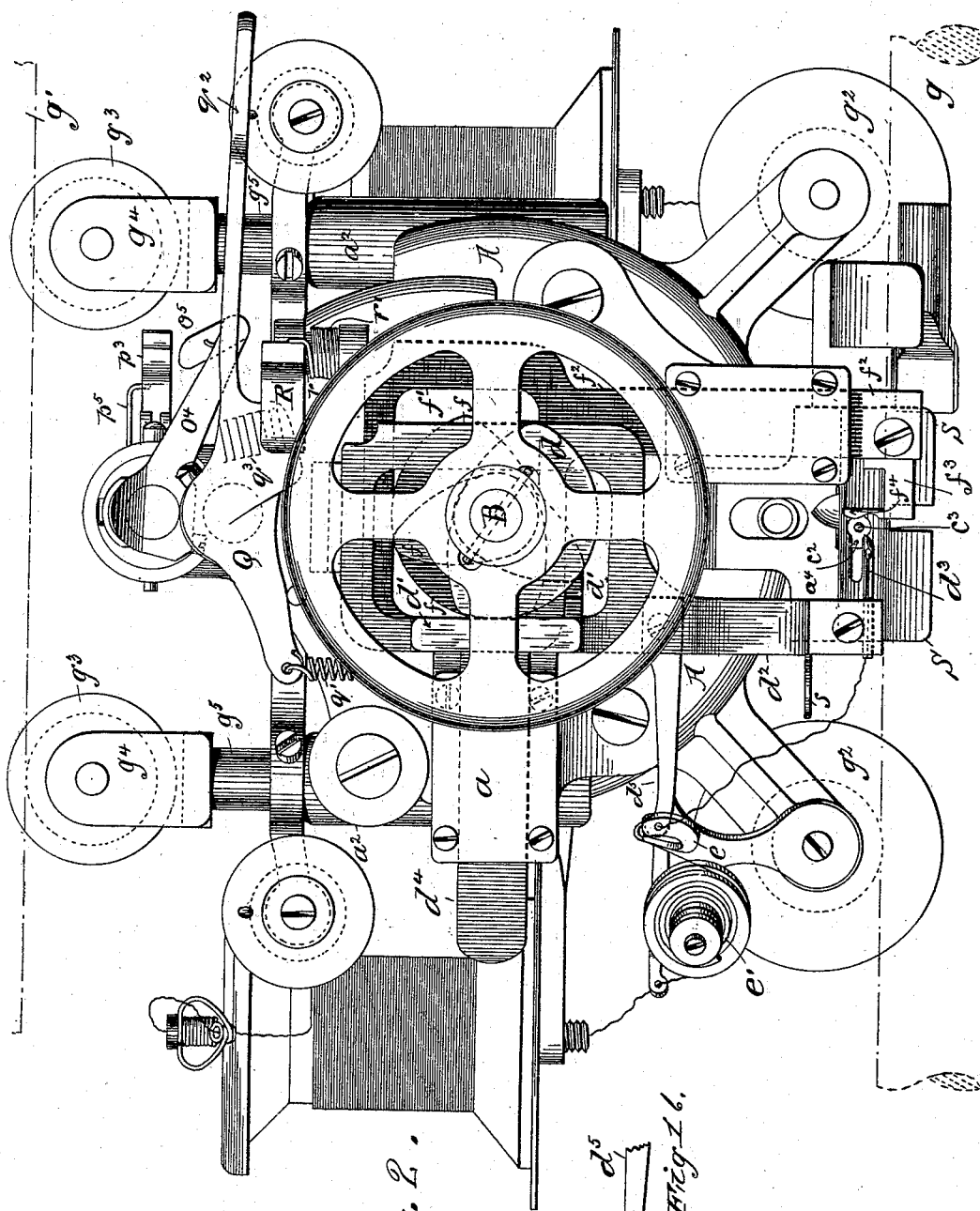


Fig. 2.

Fig. 16.

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(No Model.)

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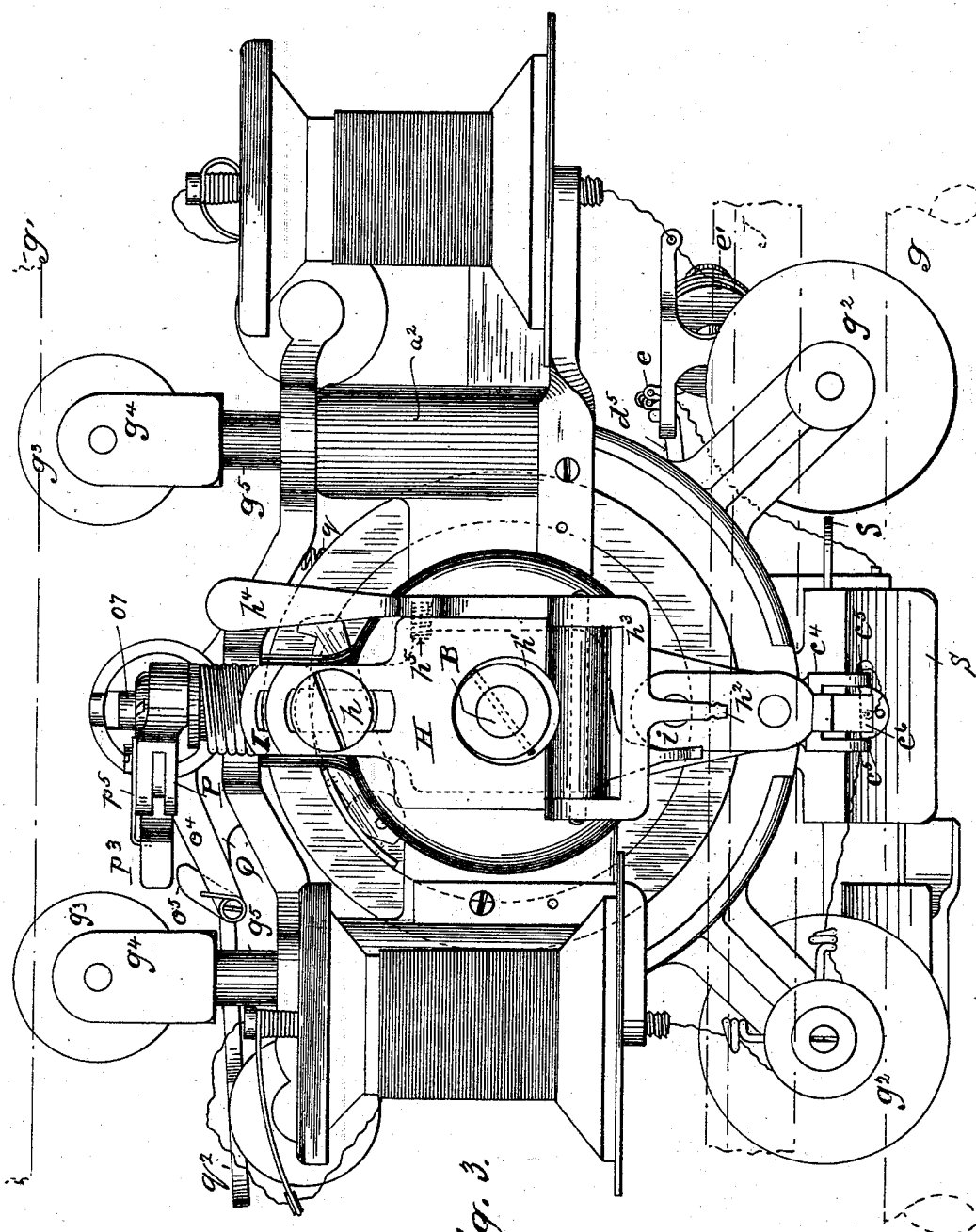


Fig. 3.

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(No Model.)

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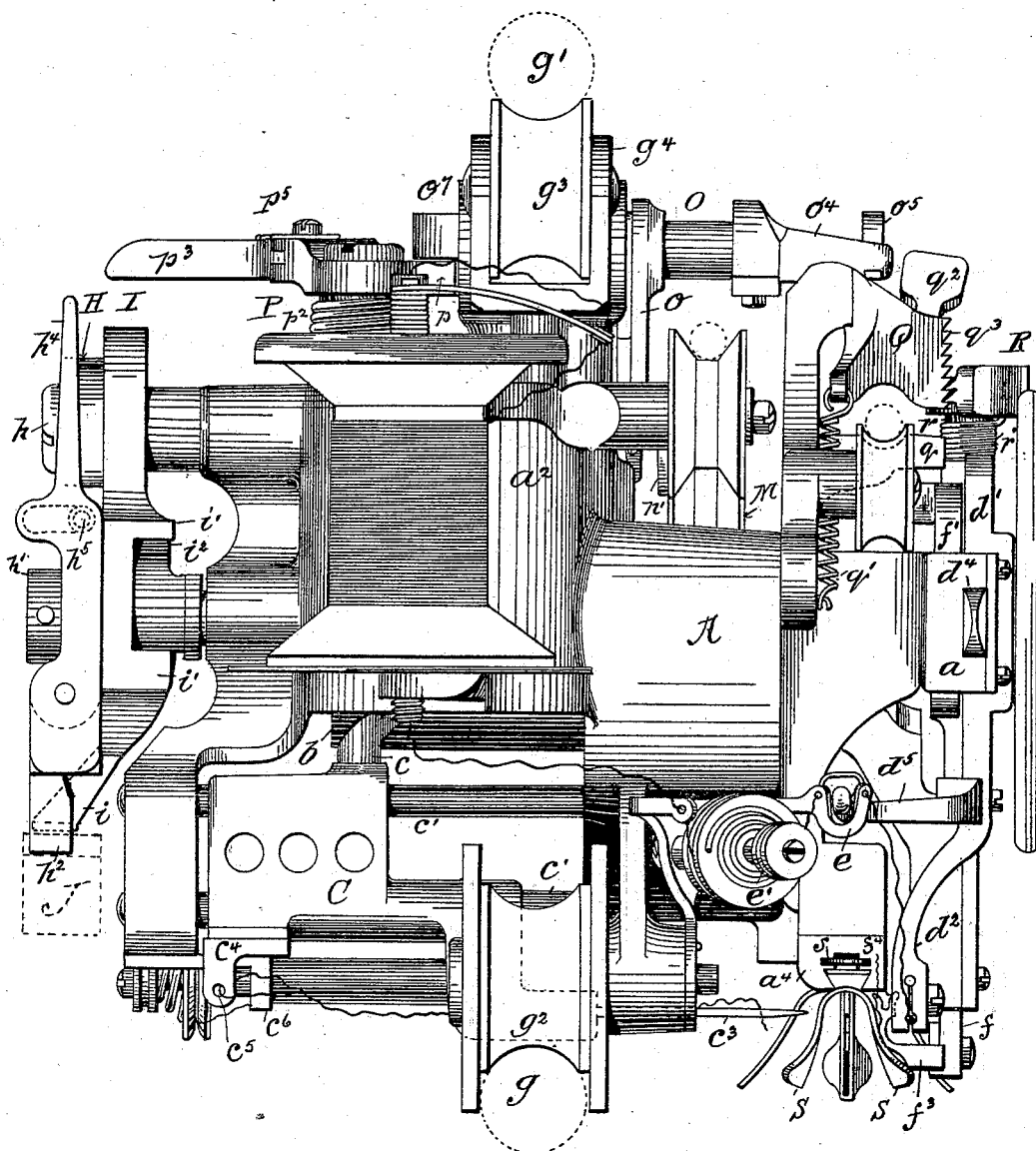


Fig. 4.

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(No Model.)

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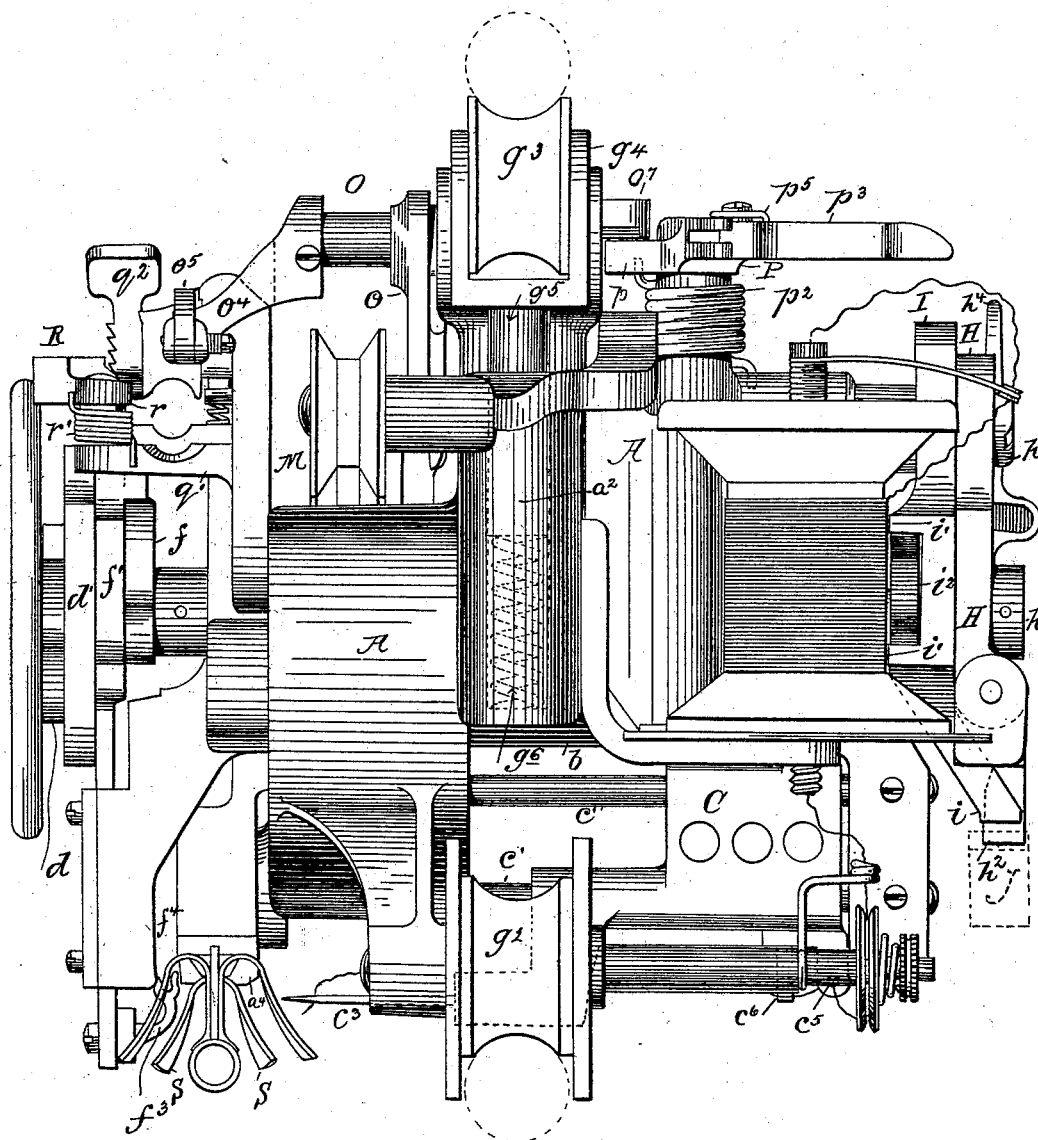


Fig. 5.

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(No Model.)

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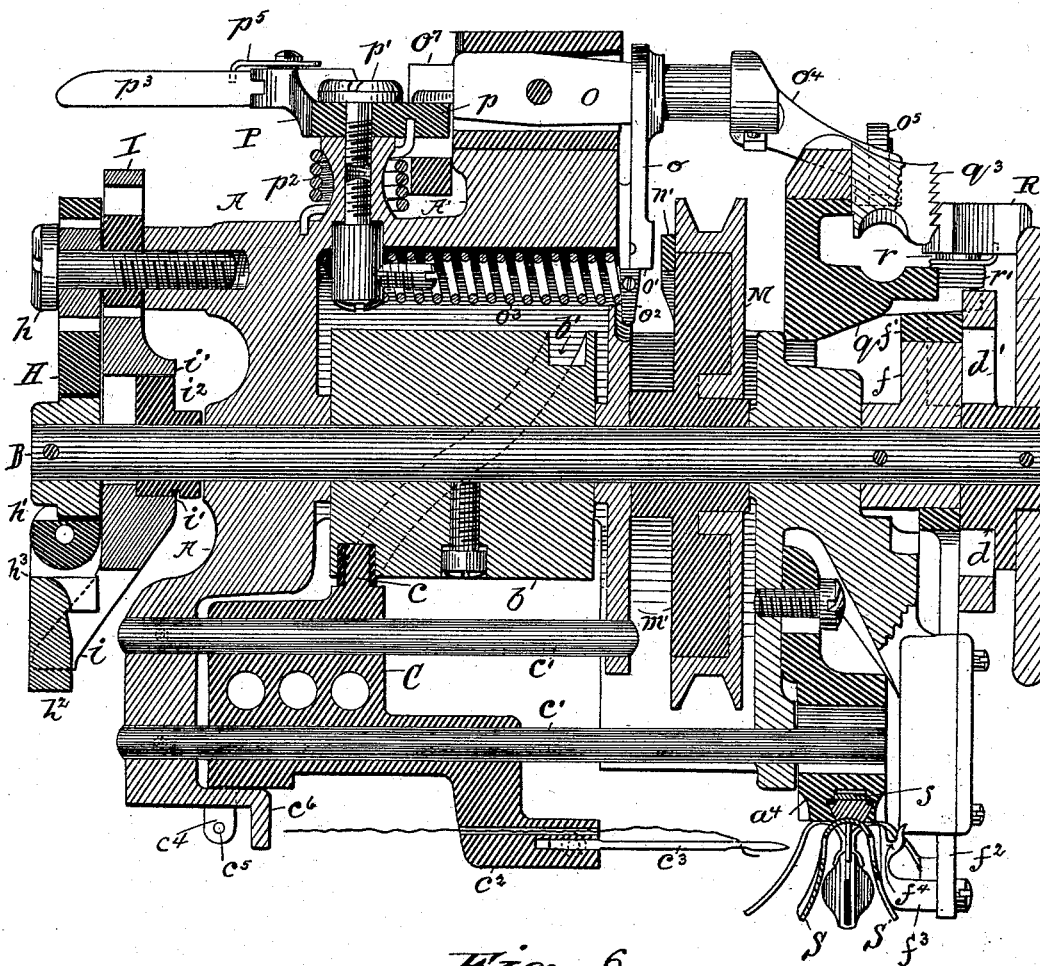


Fig. 6.

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C. W. Benjamin
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E. B. Allen
BY *Henry Salter*
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(No Model.)

8 Sheets—Sheet 7.

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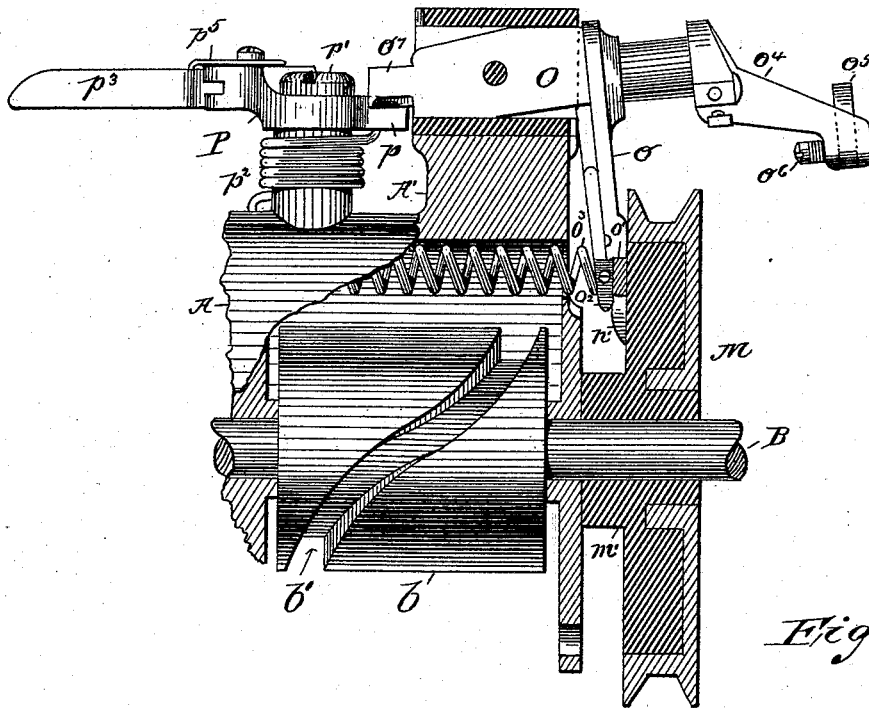


Fig. 7

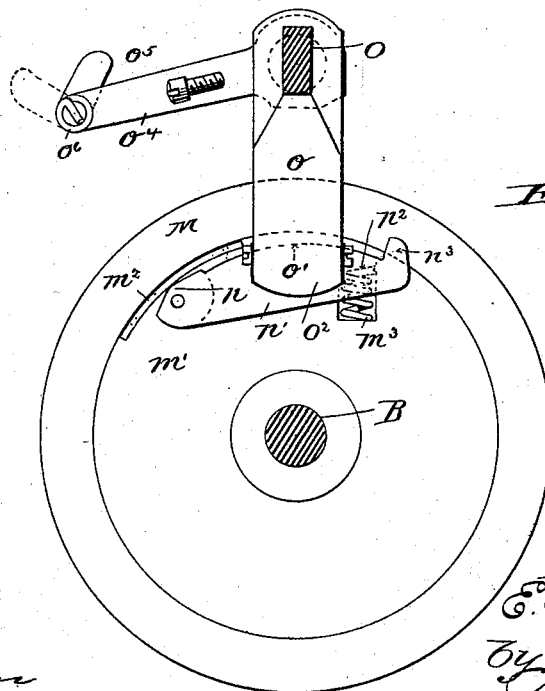


Fig. 8.

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E. B. Allen
by H. J. Salter,
att'y.

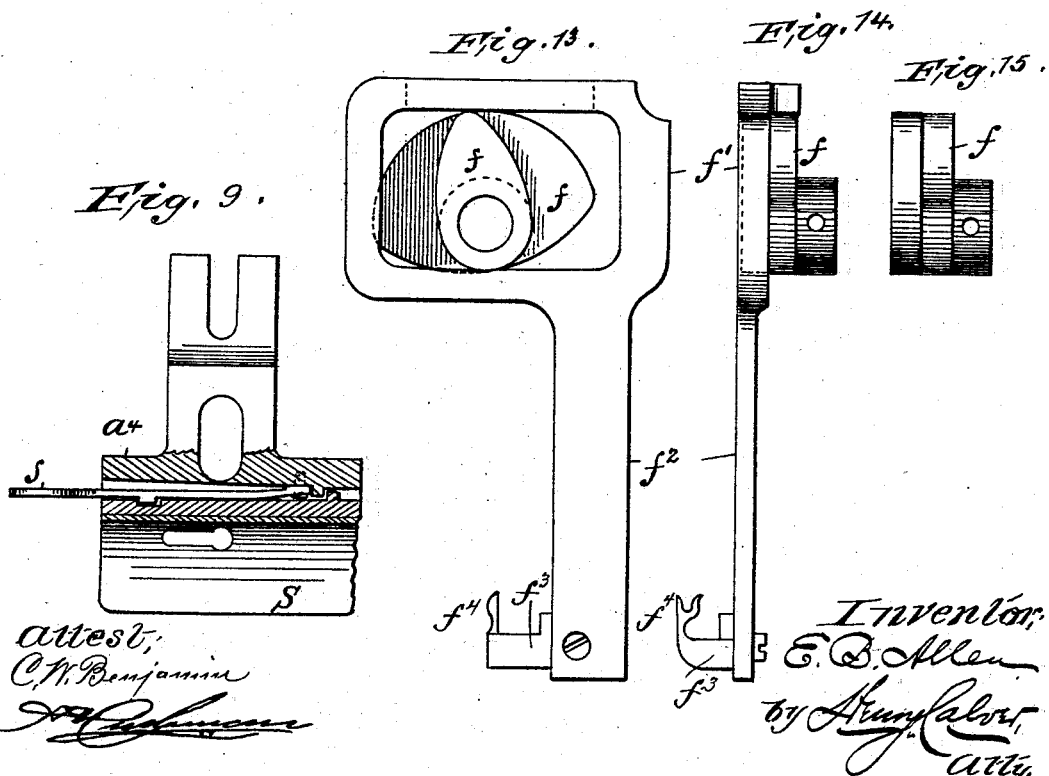
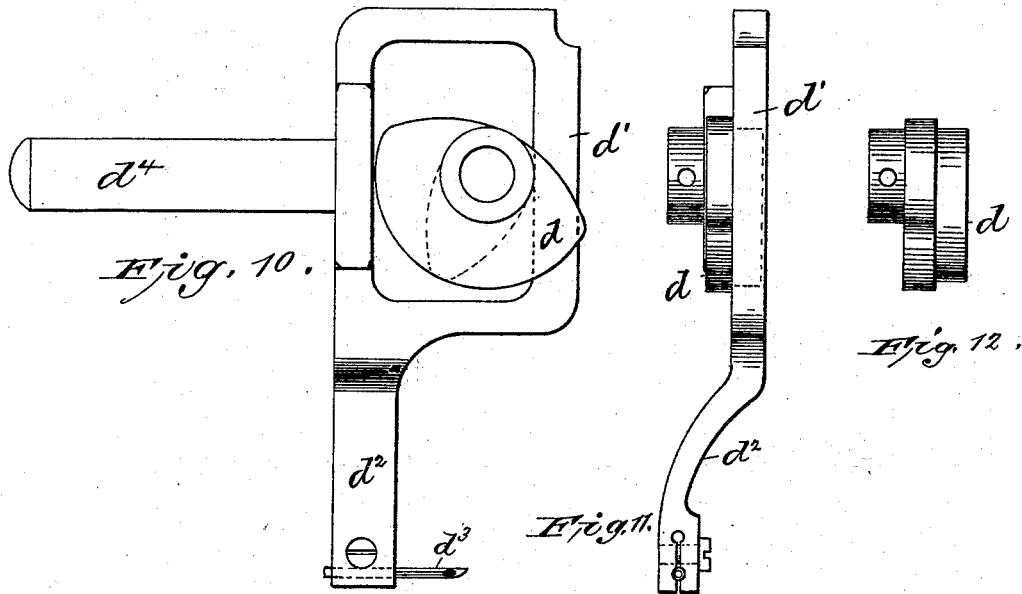
(No Model.)

8 Sheets—Sheet 8.

E. B. ALLEN.
SEWING MACHINE.

No. 524,996.

Patented Aug. 28, 1894.



UNITED STATES PATENT OFFICE.

EDWARD B. ALLEN, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY OF NEW JERSEY.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 524,996, dated August 28, 1894.

Application filed January 2, 1894. Serial No. 495,390. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. ALLEN, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to that class of sewing machines more particularly adapted for uniting long sections of carpets or other heavy fabrics which are held stationary while the sewing machine is caused to travel or be fed along relative thereto; and my invention has for its object to provide a simple, compact and efficient sewing machine, of the class referred to, having movements which are strong and positive so that the machine may be run at high speed, as also to provide an improved mechanism for making a double chain stitch seam.

In the drawings, Figure 1 is a plan view of my improved sewing machine. Figs. 2 and 3 are opposite side views, and Figs. 4 and 5 are opposite end views thereof. Fig. 6 is a central cross section thereof. Figs. 7 and 8 are detail views of the clutch and stopping and starting devices. Fig. 9 is a detail view to illustrate the spring catch for the guide. Figs. 10, 11 and 12 are detail views to illustrate the mechanism for operating the thread carrying looper. Figs. 13, 14 and 15 are detail views to illustrate the mechanism for operating the non-thread carrying looper, and Fig. 16 is a detail view of the pull-off and take-up device.

A denotes a metal frame in which is journaled the driving shaft B provided with a driving pulley M to be run by an endless belt, said pulley having, preferably, a suitable clutch connection with said shaft.

To the shaft B is secured a cylinder *b* having a scroll cam-groove *b'* entered by a pin or roller stud *c* on a needle-carrying slide C movable on guide-rods *c'* and having an arm or lug *c''* to which the eye-pointed needle *c'''* is secured by a set screw or other suitable device. The slide C is provided with a block *c''''* having thread eyes *c'''''* arranged to pass on op-

posite sides of a stationary thread stop *c''''''* when the needle is withdrawn from the work, and thus the said thread stop, in connection with said thread eyes, from one to the other of which latter the thread runs on its way to the needle, serves as a positive take-up for the needle thread to tighten the loops of the latter when the needle is out of the work, as will be hereinafter more fully described.

To the shaft B is attached the double cam *d* working in a horizontally movable yoke *d'* having a depending bar or arm *d''* carrying an eyed or thread-carrying looper *d'''*, said yoke having a slide bar *d''''* working in a guideway formed in the part *a* of the machine frame. The yoke *d'* is also provided with a horizontally extending pull-off and take-up arm *d''''''* operating in conjunction with thread eyes formed in the thread guide arm *e*, to control the looper thread running from the tension device *e'* to the looper *d'''*. See Figs. 2 and 16.

The shaft B is provided with a second double cam *f* embraced by a vertically movable yoke *f'* having a depending arm *f''* working in a suitable slideway in the frame A and carrying at its lower end a block *f'''* having formed thereon or attached thereto a non-thread-carrying looper or loop-holder *f''''* which takes the loops of thread from the looper *d'''* and holds them open for the passage therethrough of the needle. The loopers *d'''* and *f''''* are placed on opposite sides of the path of the horizontally moving needle *c'''*, the looper *d'''* being reciprocated in a plane transverse to the plane of movement of the needle, and the looper *f''''* being reciprocated in a plane transverse to the plane of movement of the thread-carrying looper *d'''*.

My improved traveling sewing machine is fitted to run on a track or guideway consisting, preferably, of lower and upper rods *g* and *g'* and is provided with lower grooved wheels *g''* and upper grooved wheels *g'''* engaging said rods. The upper wheels *g'''* are carried by yokes *g''''* having shanks *g'''''* fitting in sockets formed in the parts *a''* of the machine frame, coil springs *g''''''*, Fig. 5, being placed in said sockets beneath said shanks to force the wheels *g'''* upward into yielding contact with the rods *g'* and also, incidentally, to increase

the downward pressure of the lower wheels, thereby holding the machine firm and steady on its track or guideway.

The feeding movements of the machine are effected by a feed lever H pivoted near its upper end on the shank of a screw h received in a slot at the upper end of said lever, and the shaft B is provided with an eccentric h' fitting in an opening in the central or yoke portion of said lever, the latter carrying at its lower end a tooth h^2 to engage the teeth of the rack-bar J extending parallel to the track or guideway on which the machine runs. The tooth h^2 is carried by a yoke h^3 forming part of the lever H and pivoted to the body portion thereof so as to be adapted to beswung sidewise by its handle h^4 to disengage the tooth h^2 from the said rack-bar when it is desired to run the machine freely backward or forward on its track or guideway.

Any suitable friction device, as spring-pin h^5 , may be employed to hold the handle h^4 in either position to which it may be moved.

The pin h^5 is seated in the body of the lever H and is pressed outward against the handle h^4 by a small coiled spring placed behind it in its seat.

Co-operating with the feed lever H is a holding bar I having at its lower end a tooth i which engages the teeth of the rack-bar J, said bar I being slotted at its upper end for the passage of the shank of the screw h , and being provided with flanges i' between which works a cam i^2 on the shaft B, said cam serving to impart vertical reciprocating movements to said bar and said movements being in opposition to the vertical movements of the feed lever H so that when the tooth h^2 of the latter is in engagement with the rack-bar J and the feeding movement is occurring the tooth i is lifted clear of the said rack-bar, the said tooth i being in engagement with the rack-bar to hold the machine stationary, when the tooth h^2 of the feed lever is lifted therefrom and the feed lever is making its backward or return movement. When the machine is stopped the holding bar will be lifted so that when the feeding tooth h^2 is swung aside, as above described, the machine will be free to be run backward or forward as may be desired.

The clutch connection of the driving pulley M with the shaft B, as herein shown, is as follows: To the said shaft B is secured a wheel m' surrounded by the said pulley M and between the latter and said wheel is placed a shoe m^2 acted on by a cam n seated in said wheel and provided with an arm n' having a lug n^2 against which presses a coil spring m^3 to cause the cam n to force said shoe m^2 into holding contact with the pulley M to give the latter a driving engagement with the wheel m' and thus connect said pulley with the shaft B to which said wheel is keyed. The shoe m^2 is retained in place by small dowel pins on the wheel m' , said pins being denoted by dotted lines in Fig. 8.

Pivoted to the post A' forming part of the frame of the machine is a stopping and starting lever O having a depending arm o at the lower end of which is a shoulder o' to engage the upper edge of the arm n' and turn the cam n slightly, in opposition to the action of the spring m^3 , when the shoe m^2 is to be disengaged from the pulley M to permit the latter to run free, said arm n' having at its end a hook or projection n^3 to engage said arm o and thus positively stop the wheel m' and the main or driving shaft B to which said wheel is connected. The arm o is provided, below the shoulder o' , with a brake o^2 having a friction surface of raw hide, or other suitable material, to engage the side or face of the arm n' to arrest the movement of the wheel m' after it has been disengaged from the pulley M and before it is positively stopped by contact of the hook n^3 with the arm o ; thus avoiding any injurious shock by the positive stop.

The lever O is tilted, to bring the arm o into contact with the arm n' , by a spring o^3 seated in the frame A and pressing against said arm o . The arm o of the lever O is disengaged from the clutch arm n' , to again set the machine in motion, by pressing on the outer end of the said lever O, or on an arm o^4 rigidly attached thereto, and to hold the said lever O in such position that its arm o will be out of contact with the clutch arm n' I provide a locking dog P pivoted on the shank of the screw p' and having a lug p extending beneath a tail-piece o^7 of the lever O, a torsional spring p^2 acting on said dog to force said lug p beneath said tail-piece o^7 when the said lever O is tilted by applying pressure to the arm o^4 . The dog P has a tripping arm p^3 which, when operated in opposition to the stress of the spring p^2 , turns said dog to remove the locking lug p from beneath the tail-piece o^7 of the lever O, thus permitting the latter, under the action of the spring o^3 , to be tilted to uncouple the clutch.

Q denotes a belt gripping lever operating in connection with a grooved block or lug q on the machine frame to take hold of a returning belt which will run the machine back to its starting position after a seam has been completed. The pivotal point of the lever Q is denoted by the dotted circle on said lever in Fig. 2. The lever Q is held in gripping position by a toothed, locking dog R pivoted on a screw r and forced into engagement with a toothed portion q^3 of said lever Q by a torsional spring r' . When the handle q^2 of the lever Q is depressed to force the gripping part of said lever against the returning belt the dog R locks it in such position, and when said dog is disengaged from said lever the latter is lifted from the belt by the spring q' .

In the use of my machine the fabric sections to be united are held edgewise vertically by suitable clamps and the fabric edges and fabric piles are controlled and brought into proper positions for the sewing opera-

tion by a suitable guide, as S, removably attached to the block a^4 on the machine frame, said block having a dove-tailed groove in which a dove-tail block on the guide fits, and a spring catch, as s, Fig. 9, serves to lock the guide in place. Interchangeable guides and pile controlling devices for different kinds of carpets are provided, and it is therefore desirable that these guides and pile controlling devices be readily removed and replaced.

In the sewing operation the action and timing of the parts is as follows: The horizontally reciprocating needle first advances and carries a loop of its thread through the fabrics to be joined, and as the needle retreats the horizontally reciprocating eyed or thread-carrying looper d^3 advances and passes a loop of its thread through the needle loop, the looper-loop being then immediately seized by the vertically reciprocating non-thread-carrying looper or loop-holder f^4 and the looper d^3 quickly retreats, dropping the needle loop which is tightened around the looper-loop by the action of the retreating needle, this action being assisted, when a tight stitch seam is desired, by the take-up consisting of the thread-eyes c^4 , moving with the needle, and the stationary thread stop c^6 . At the time when the needle is retreating and before the thread eyes c^5 reach the thread stop c^6 the needle thread runs taut from one to the other of said thread eyes. While the needle is out of the work and is retreating and tightening its own loop with the assistance of the take-up just referred to the feed lever H is operated to move the machine forward, the looper-loop, extending from the looper d^3 , around the looper f^4 , and thence to the work, being still held by the non-thread-carrying looper or loop-holder f^4 which holds said looper-loop open for the passage therethrough of the needle on the next forward movement of the latter; and when the needle has thus entered the looper-loop the looper f^4 moves downward and drops said loop which is now fully tightened around the needle by the action of the take-up and pull-off arm d^5 moving with the thread-carrying looper d^3 as the said looper again advances to pass its loop through the needle loop; said pull-off and take-up arm, after having tightened the looper-loop, as just stated, drawing through the tension device e' enough thread for the formation of the next stitch, the slack thread given up as the pull-off and take-up arm moves backward with the looper d^3 being taken up by the forward movement of the machine for the next stitch. It will thus be seen that owing to the fact that the needle loops are quickly dropped from the thread-carrying looper proper time is given for tightening said needle loops while the needle is out of the work, and I am thereby enabled to use a much shorter needle than can be employed in previous double chain stitch mechanisms in which the needle loops are tightened around the thread carrying loopers at the last part of the forward or

downward movements of the needles, these movements, for the purpose of tightening the needle loops, being about half an inch farther forward or downward than would otherwise be required merely to form loops for the passage of the loopers, and therefore necessitating the use of the needles about one half inch longer than would otherwise be necessary. Also in thus tightening the needle loops by a backward or upward, instead of by a forward or downward, pull on the needle thread the strain on the latter is very much less; as in the backward or upward tightening movement the thread is drawn but once through the fabrics, while in the forward or downward tightening movement the thread is drawn twice through the fabrics, this difference being very considerable, particularly with heavy fabrics like carpets. Furthermore with the backward or upward tightening movement there is less strain on the needle and less reeving of the thread through the eye of the needle, and consequently less chafing and weakening of the needle threads; and by holding the looper-loops by the non-thread-carrying looper rather than by the thread-carrying looper when the feed takes place strain on the thread-carrying looper, which is the more delicate instrument, is avoided.

I do not wish to be understood as limiting the use of my improved double chain-stitch-forming mechanism to a traveling sewing machine, or one in which the needle reciprocates horizontally, as it would operate as well in a machine in which the work, instead of the machine, was fed along, or in a family or manufacturing machine of ordinary type having a vertically reciprocating needle-bar; the short needle and the co-acting stitch forming devices of my improved machine, operating as described, rendering my invention particularly adapted for high speed machines.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In a sewing machine, the combination with a feeding mechanism, of an eye-pointed needle, an eye-pointed, thread-carrying looper adapted and serving to pass loops of its thread through the loops of needle thread, a non-thread-carrying looper to take the looper loops and hold them for the passage of the needle, the said loopers being located on opposite sides of the path of movement of the said needle, the said thread-carrying looper being reciprocated in a path transverse to the plane of movement of the needle, and the said non-thread-carrying looper being reciprocated in a plane transverse to the plane of movement of the said thread-carrying looper, and means, substantially as described, for operating the parts, whereby they may be so timed as to enter the said non-thread carrying looper into a looper loop and to withdraw the said thread-carrying looper from a needle loop while the needle is making its backward or return movement, thus permitting the looper loops to be

held by the said non-thread-carrying looper while the feed is occurring.

2. In a sewing machine, the combination with a feeding mechanism, of an eye-pointed needle, an eye-pointed, thread-carrying looper adapted and serving to pass loops of its thread through the loops of needle thread, a non-thread-carrying looper to take the looper loops and hold them for the passage of the needle, and a take-up device for the needle thread, the said loopers being located on opposite sides of the path of movement of said needle, the said thread-carrying-looper being reciprocated in a plane transverse to the plane of movement of the needle, and the said non-thread-carrying looper being reciprocated in a plane transverse to the plane of movement of the said thread-carrying looper, and means, substantially as described, for operating the parts, whereby they will be so timed as to enter the said non-thread-carrying looper into a looper loop and to withdraw the said thread-carrying looper from a needle loop while the needle is making its backward or return movement, thus permitting the needle loops to be tightened by the said take-up device while the needle is out of the work, and causing the looper loops to be held by the said non-thread-carrying looper while the needle loops are thus being tightened and while the feed is occurring.

3. In a sewing machine, the combination with a feeding mechanism, of an eye-pointed needle, an eye-pointed, thread-carrying looper adapted and serving to pass loops of its thread through the loops of needle thread, a non-thread-carrying looper to take the looper loops and hold them for the passage of the needle, a take-up device for the needle thread, a pull-off and take-up device for the looper thread, and means, substantially as described, for operating the parts, whereby they will be so timed as to enter the said non-thread carrying looper into a looper loop and to withdraw the said thread carrying looper from a needle loop while the needle is making its backward or return movement, thus permitting the said needle loops to be tightened by the said needle thread take-up device while the needle is out of the work and the feed is occurring, and while the looper loops are held by the said non-thread-carrying looper.

4. The combination with the driving shaft B provided with the cylinder *b* having the cam-groove *b'*, of the needle-carrying slide C having a pin or roller stud engaging said cam groove, the double cam *d*², the yoke *d'* embracing said cam and provided with the arm *d*, the eyed-looper *d*³ carried by said arm *d*², the double cam *f*, the yoke *f'* embracing said cam *f* and having the arm *f*² and the non-thread-carrying looper *f*⁴ carried by said arm.

5. The combination with the driving shaft B provided with the cylinder *b* having the cam-groove *b'*, of the needle-carrying slide C having a pin or roller stud engaging said cam groove, the double cam *d*², the yoke *d'* em-

bracing said cam and provided with the arm *d*, the eyed-looper *d*³ and the pull-off and take-up arm *d*⁵ both carried by said arm *d*², the eyed thread guide arm *e* co-operating with said pull-off and take-up arm, the double cam *f*, the yoke *f'* embracing said cam *f* and having the arm *f*² and the non-thread-carrying looper *f*⁴ carried by said arm.

6. The combination with the needle-carrying, sliding-block C provided with the thread eyes *c*⁵ and from one to the other of which thread eyes the needle thread is to run, of the stationary thread stop *c*⁶ located between the paths of movement of the said thread eyes, the eye-pointed, thread-carrying looper *d*³, the non-thread carrying looper *f*⁴, and means for operating said needle-carrying, sliding-block and loopers.

7. The combination with a toothed rack-bar, a track or guideway and a traveling sewing machine to run on said track or guideway and provided with a feed lever and a holding bar both having teeth or parts adapted to fit closely between the teeth of the said rack-bar, and means for operating said feed lever and holding bar to cause the engaging teeth or parts thereof to alternately pass between the teeth of said rack-bar and to be entirely withdrawn from engagement with said rack-bar, said operating means serving also to vibrate said feed lever to move the machine forward when the tooth of the said holding bar is disengaged from the said rack-bar.

8. The combination with a toothed rack-bar, a track or guideway and a traveling sewing machine to run on said track or guideway and provided with a feeding lever and a holding bar both having engaging teeth or parts adapted to fit closely between the teeth of the said rack-bar, means for operating said feed lever and holding bar to cause them to engage the said rack bar alternately, and a pivoted part by which the portion of said feed lever which engages the said rack bar is carried so that said engaging portion may be swung aside to disengage said traveling machine from said rack-bar when said machine is to be run backward.

9. The combination with a toothed rack-bar, a track or guideway and a traveling sewing machine to run on said track or guideway and provided with feeding and holding devices having teeth or parts adapted to fit closely between the teeth of the said rack-bar, and means for operating said feeding and holding devices to cause them to engage said rack-bar alternately, the rack-bar engaging part of one of said devices being constructed to be swung aside so that the machine may be wholly disengaged from said rack-bar when desired.

10. The combination with a toothed rack-bar, a track or guideway and a traveling sewing machine to run on said track or guideway, said traveling sewing machine having a driving shaft which is provided with the eccentric *h* and the cam *i*², of the feed lever H

having a tooth or part to fit between the teeth of the said rack-bar, said feed lever being operated by said eccentric to have a reciprocating and a vibrating motion, and the holding bar I also having a tooth to fit closely between the teeth of the said rack bar and said holding bar being operated by said cam to have a reciprocating movement only.

10 11. The combination with the traveling sewing machine the driving shaft of which is provided with the eccentric h' and the cam i^2 , of the feed lever H operated by said eccentric to have a reciprocating and vibrating motion and the holding bar I operated by said cam to have a reciprocating movement only, the said feed lever having the pivoted yoke h^3 provided with the operating handle h^4 and with the feeding tooth h^2 .

20 12. The combination with a traveling sewing machine, the frame of which is provided with a grooved block a^4 , of a guide or pile controlling device adapted to ride over the

edges of the carpets and having a block which fits in the said grooved block a^4 , and the spring catch or latch s attached to the said block a^4 and serving to removably secure the said guide or pile controlling device to the said machine.

13. The combination with a track or guideway consisting of the lower and upper rods g and g' , of a traveling sewing machine provided with lower and upper grooved wheels g^2 and g^3 engaging said rods, the yokes g^4 carrying said wheel g^3 and having shanks g^5 , the machine frame provided with sockets in which said shanks fit, and coil springs g^6 placed in said sockets beneath said shanks.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD B. ALLEN.

Witnesses:

HENRY CALVER,
J. F. JAQUITH.