

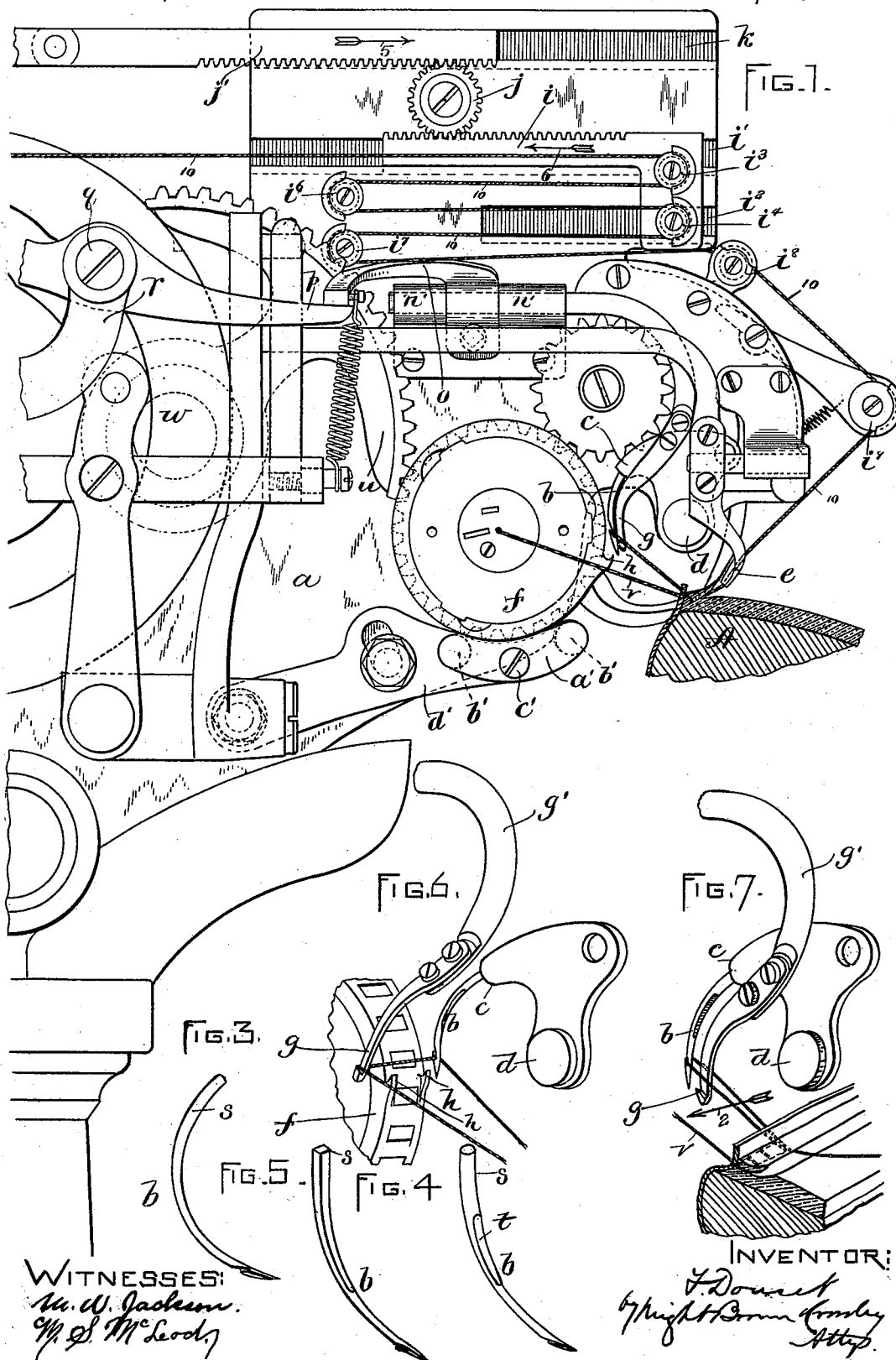
(No Model.)

2 Sheets—Sheet 1.

F. DOUCET.
SEWING MACHINE.

No. 507,530.

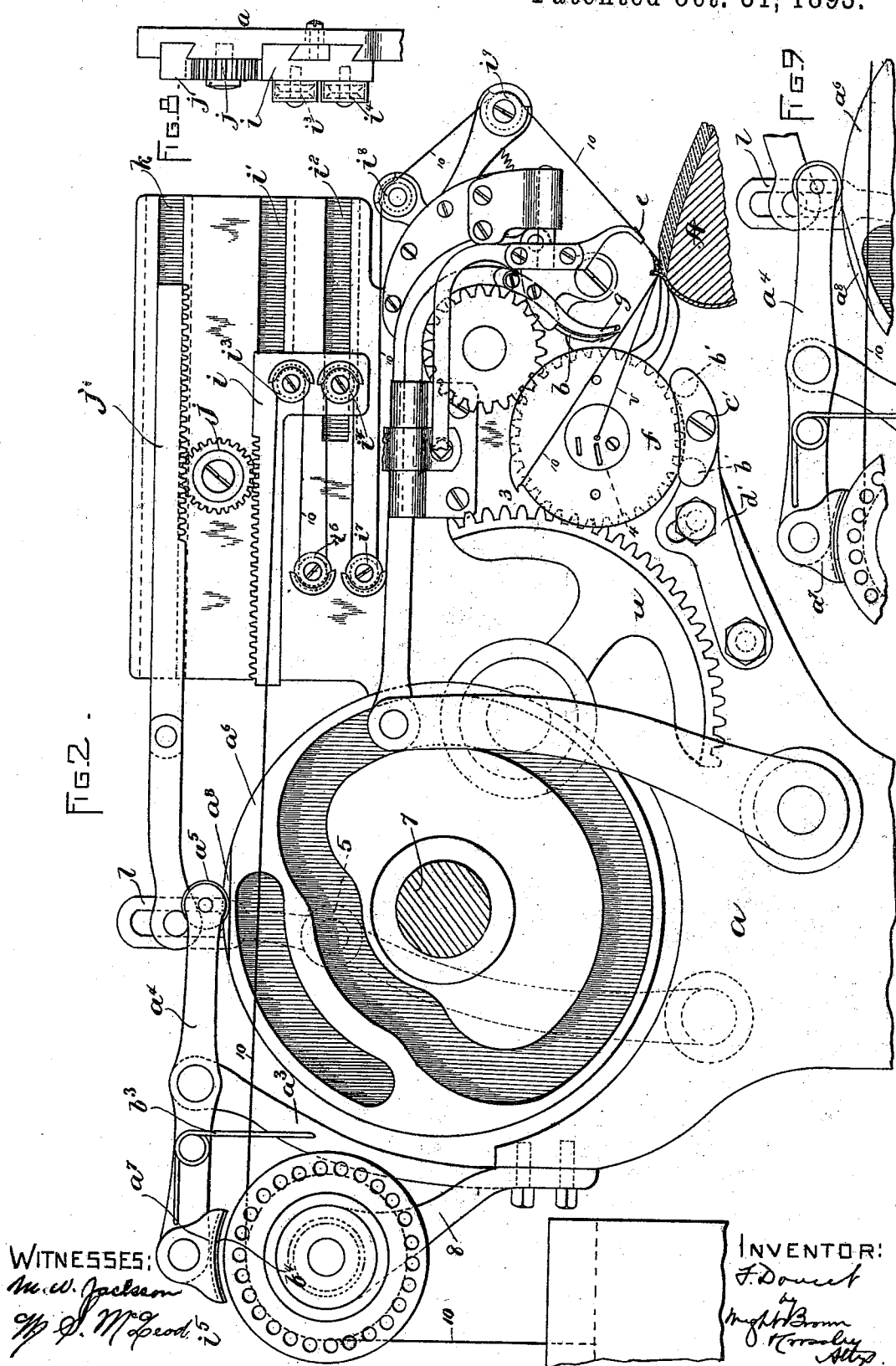
Patented Oct. 31, 1893.



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UNITED STATES PATENT OFFICE.

FELIX DOUCET, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE GOODYEAR SHOE MACHINERY COMPANY, OF PORTLAND, MAINE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 507,530, dated October 31, 1893.

Application filed October 14, 1892. Serial No. 448,830. (No model.)

To all whom it may concern:

Be it known that I, FELIX DOUCET, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates to lock-stitch wax-thread sewing machines, of the class shown and described in Letters Patent of the United States No. 457,578, granted to me August 11, 1891.

The invention consists in the several improvements which I will now proceed to describe and claim.

Of the accompanying drawings forming a part of this specification, Figure 1 represents a side elevation of a part of a sewing machine provided with my improvements. Fig. 2 represents a side elevation on a smaller scale, showing the thread feeding and tension devices and the take up mechanism in the opposite position from that shown in Fig. 1. Fig. 3 represents an enlarged side view of my improved needle. Fig. 4 represents a perspective view of the same. Fig. 5 represents a modified form of the same. Figs. 6 and 7 represent perspective views of the loop spreading devices. Fig. 8 represents an end view of the take up mechanism and the supports therefor. Fig. 9 represents a detail view hereinafter referred to.

In the drawings, *a* represents a part of the head which supports the operating mechanism.

b represents a curved needle which is attached to an oscillating arm *c* mounted on a bearing *d*. Said arm is oscillated to cause the needle to alternately penetrate and recede from the work *A*.

e represents a looper which is arranged to present the needle thread to the barb of the needle when the latter is projected.

f represents the rotating ring or case inclosing the lower thread which may be inserted as a cop in said case or may be wound on a reel or bobbin within the case. For the sake of convenience I call said ring or case a shuttle. Said shuttle is provided with hooks *h h* which are caused to engage the needle loop and carry it around the shuttle, this arrangement causing the needle loop to

be interlocked with the shuttle thread as described in my former patent.

g represents the loop spreader which is so moved relatively to the movement of the needle while the loop is held by the barb of the needle, as that said spreader is caused to spread the loop to bring it into the path of the hooks *h h*, which are brought by the rotation of the ring *f* into position to engage the loop and carry it around to the rear of the shuttle ring or case, where it is cast off from the hooks and tightened by the take up mechanism.

The take up mechanism consists of a reciprocating slide *i* adapted to slide in grooves *i' i''* formed in the head *a*. Said slide has rack teeth upon its upper side adapted to mesh with a pinion *j* mounted on a bearing affixed to the head *a*. The pinion *j* meshes with a rack on a slide *j'* which is also arranged to slide in a groove *k* in the head *a*. Motion is imparted to the riding rack *j'* by an arm *l* pivotally attached to the frame at its lower end and having a cam roll *5* adapted to engage with a suitable cam groove formed in a disk *a⁵* attached to the driving shaft 7.

The outer end of slide *i* is provided with thread receiving pulleys *i³ i³* the thread passing from the tension wheel *i⁵* (Fig. 2) to and around the pulley *i³* and from thence to and around a pulley *i⁶* mounted upon a bearing affixed to the frame *a* and then around the pulley *i⁴* upon the slide *i* and back around a second pulley *i⁷* also affixed to the frame passing from the last named pulley over pulleys *i⁸ i⁹* to the looper *e*.

The sliding rack *j'* when reciprocated imparts a rotary motion to the pinion *j* and through the latter to the slide *i*, the sliding rack *j'* moving simultaneously with the shuttle ring and needle. In the position shown in Fig. 1, the needle has entered the work and drawn the loop therethrough. At this point the position of the thread carrying slide *i* is such that the movement of the sliding rack *j'* in the direction of the arrow 5 marked thereon will cause the pinion *j* to move the thread-carrying slide *i* in the direction of the arrow 6 to deliver the thread to the needle and shuttle as the latter carries the loop from the needle to the rear side of said shuttle, the thread de-

livering movement being completed when the thread carrying slide has reached the position shown in Fig. 2, at which point the movement of the thread carrying slide ceases.

5 As will be understood by reference to the position of the shuttle in Fig. 2, an additional amount of thread will be required by the rotation of the shuttle from the point 3 shown in said figure to the point 4 (marked
10 thereon in dotted lines) which is the point at which the thread will be cast off. Said amount is supplied by the rotation of the tension wheel t^5 which wheel may be of any suitable pattern. The tension wheel here shown is
15 journaled in suitable bearings in a standard S affixed to the frame or head a , and around which the thread 10 is carried from the wax-pot in the usual way.

a^3 represents an arm or support secured to
20 the frame a at its lower end, and has pivoted at its upper end a lever a^4 to one end of which is pivoted a trundle roll a^5 adapted to bear upon the periphery of the disk a^6 upon the shaft 7. The opposite end of the lever is
25 provided with a shoe a^7 pivotally attached thereto and is adapted to be brought into engagement with the periphery of the tension wheel to act as a brake to the latter and regulate the supply of thread that is required
30 to form each stitch. The brake is held in contact with the tension wheel by the engagement of the trundle roll with the periphery of the disk a^6 as shown in Fig. 9 and is released from said contact once in each revolution
35 of said disk by a depression a^8 found in the periphery of the same, which depression causes the roll-carrying end of the lever to be depressed, and causes the opposite end of the lever with its brake to be raised from contact
40 with the tension wheel so that the latter is permitted to rotate while the trundle roll is in the depressed portion of the disk Fig. 2. The brake is again applied and the tension wheel is held fixed after the depressed
45 portion a^8 passes away from roll a^5 .

A spring b^3 (Fig. 2) is provided, one end of which is attached to the supporting standard a^3 of the lever a^4 and the other end to the lever near the outer end thereof. The tension
50 of said spring normally presses the shoe away from contact with the periphery of the tension wheel and causes the trundle roll to enter the depressed portion of the disk.

The brake shoe is or may be provided with
55 a yielding facing to insure an effective retarding contact with the tension wheel.

As before stated the amount of thread required by the rotation of the shuttle ring from the point 3 to the point 4 shown in Fig. 2, is
60 the amount necessary for the succeeding stitch. The form and arrangement of the depression a^8 regulate the release of the tension wheel and the amount of thread delivered as required by the rotation of the shuttle ring from the point 3 to the point 4 as
65 shown in Fig. 2. After the shuttle ring has carried the thread to the point 4, the rotation

of the ring is reversed, the loop being cast off and the thread carrying slide is carried in the opposite direction as shown in Fig. 1, 70 which causes the cast off loop to be taken up and drawn through the work until locked in the work by the shuttle thread.

By reference to my former patent it will be seen that the loop spreader is arranged in relation to the needle so as to bring the curve
75 of the loop spreader in an opposite direction from the curve of the needle, which arrangement renders it difficult to bring the spreader in line with the needle vertically as is necessary to enable the needle to draw the loop
80 over the point of the loop spreader. In the present case I provide an arm g' journaled in bearings $n' n'$ on the frame a . The outer portion of said arm is curved and has at-
85 tached to its free end the loop spreader g , the latter being curved to approximate the curve of the needle and arranged in line with the same as shown in Figs. 1 and 7, by which ar-
90 rangement I am enabled to readily draw the loop over the spreader when the needle is retracted in the usual way. The loop spreader is moved in the direction of the arrow 2 by being oscillated in its bearings by an arm o
95 attached to the same. The outer end of said arm engages with an arm p pivoted at q to a support r . The outer end of arm p (not shown) is adapted to engage with any suitable operating device.

b represents a circular needle constructed
100 with a thickened shank, and thereby enabled to be used without the needle guide usually provided for use upon this class of machines. Said needle is formed in the usual manner as
105 to the portion which enters the material which is of a uniform diameter, but the shank s of the needle is enlarged to the extent required to give the latter a considerable degree of strength. A portion t of the shank is
110 flattened to permit of the closer proximity of the loop spreader. By thus thickening the shank I provide sufficient stock to resist the lateral strain upon the needle caused by the
115 entrance of the needle into the work and by the loop spreader in spreading the loop. I have shown in Fig. 5, the needle formed with a square shank s adapted to fit a like shaped pocket in the needle arm. This construction
120 enables the needle to be more firmly secured in the needle arm and obviates the liability of the needle being turned in its socket by the lateral strain of the loop spreader upon the point thereof.

It will be seen that by enlarging the shank of the needle and thus enabling the usual
125 needle guide to be dispensed with, I enable the loop spreader to be located in close proximity to the needle and to be curved substantially parallel with the curvature of the needle as shown in the drawings. 130

In my hereinbefore mentioned patent I have shown and described the ring or case f as adapted to be rotated to carry the loop around the shuttle. To lock said loop with the shut-

the thread *v* I prefer to give the ring or case an oscillatory movement, because this movement is capable of being produced by simpler mechanism than a continuous rotary movement, the latter requiring more mechanism as a varying rotation is necessary. In the oscillating movement the loop being cast off the hooks the hooks are returned to their loop engaging position by simple mechanism.

10 The oscillatory movement may be imparted to the ring or case by any suitable means. I have shown a segmental gear *u* mounted upon a shaft *w* which is oscillated in any suitable manner and imparts like motion to the ring.

15 The ring is supported upon a yoke *a'* having rolls *b' b'* in each end thereof and bearing upon the periphery of said ring. The yoke is pivoted at *c'* to one end of an arm *d'* adjustably secured to the frame *a*, and is enabled by its pivotal connection to tip slightly when the thread is passing under it, and thus permit the thread to pass more readily between the ring and the idle rolls supporting the ring, than would be the case if the said

20 rolls were on a fixed support.

It is obvious that the shuttle or thread case may be continuously rotated instead of being reciprocated so far as all the features of the invention are concerned excepting those relating to the oscillation of the shuttle.

30

It will be seen that the close proximity of the thread spreader to the needle, enables the spreader to support the needle and prevent breakage of the latter in case the thread becomes accidentally caught, when the spreader is in line with the needle.

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Having thus described my invention and set forth the advantages resulting therefrom, what I claim is—

1. The combination of a thread holding ring or case, means substantially as described for operating said ring, and a pivoted support having idle rolls to bear against and support the ring, said support being free to tilt or rock slightly on its pivot, for the purpose described.

40 45

2. The combination of a ring or case adapted to contain the lower thread and provided with hooks projecting outside its periphery to engage the needle loop, a curved needle and a spreader for the loop curved to approximate the curve of the needle and operating in close proximity thereto, substantially as described.

50

3. The combination of a thread holding ring or case, means for operating the same, hooks projecting outside its periphery to engage the loop, a loop spreader curved to approximate the curve of the needle, and a curved needle provided with an enlarged shank whereby the needle is adapted to resist the lateral strain exerted upon it, as set forth.

55 60

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 8th day of October, A. D. 1892.

65

FELIX DOUCET.

Witnesses:

C. F. BROWN,
M. W. JACKSON.