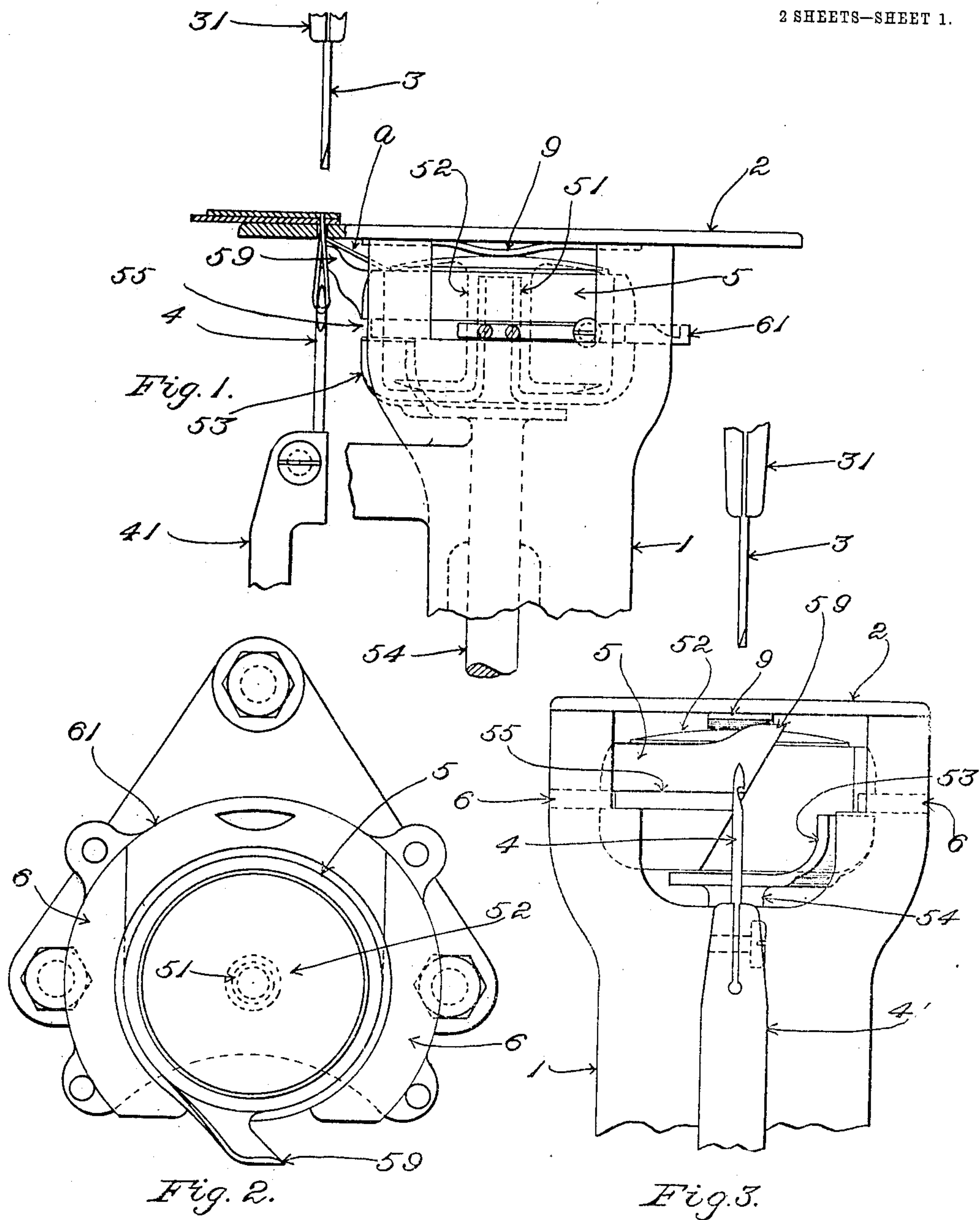


F. W. MERRICK.
LOCK STITCH SEWING MACHINE.
APPLICATION FILED JUNE 17, 1904.

906,730.

Patented Dec. 15, 1908.

2 SHEETS—SHEET 1.



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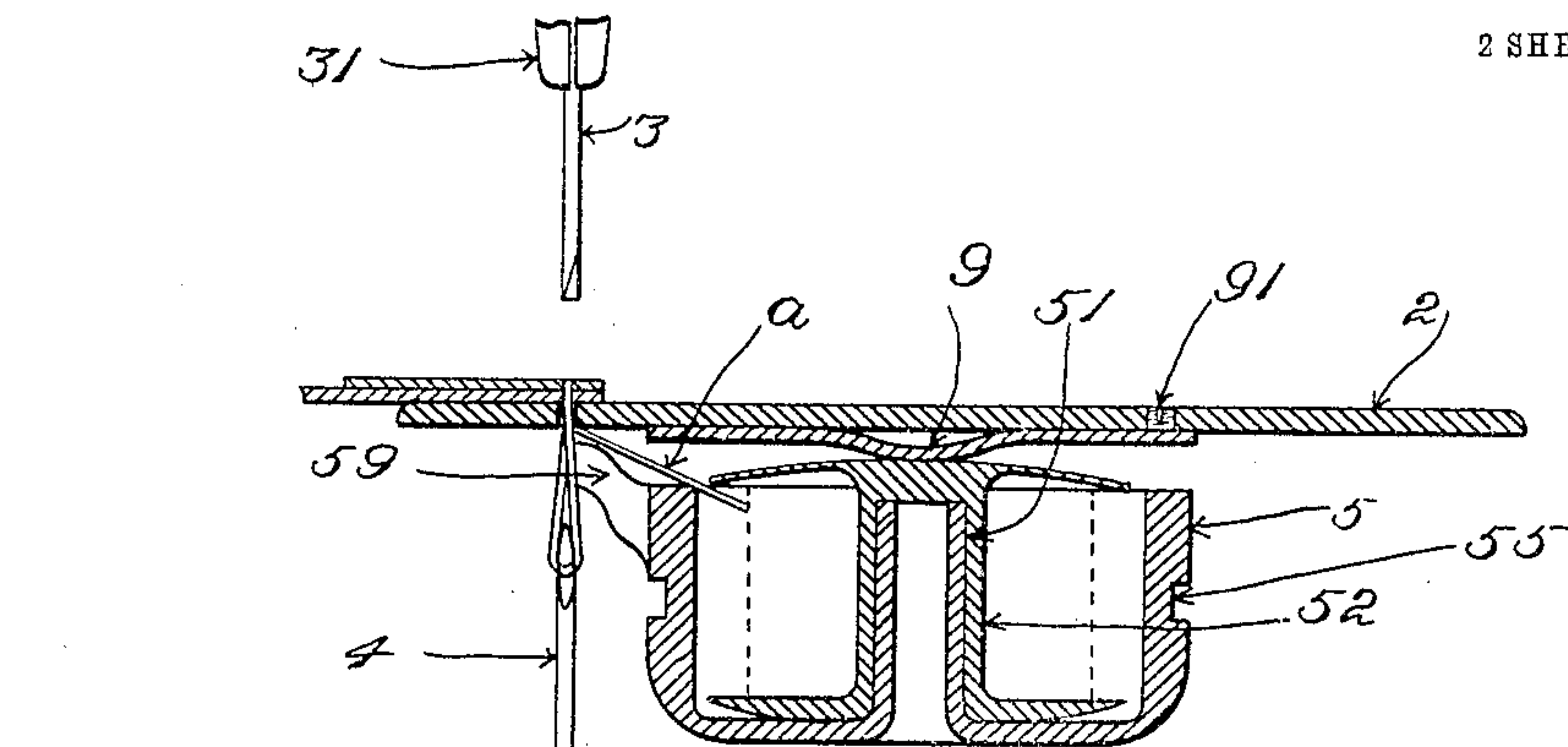


Fig. 4.

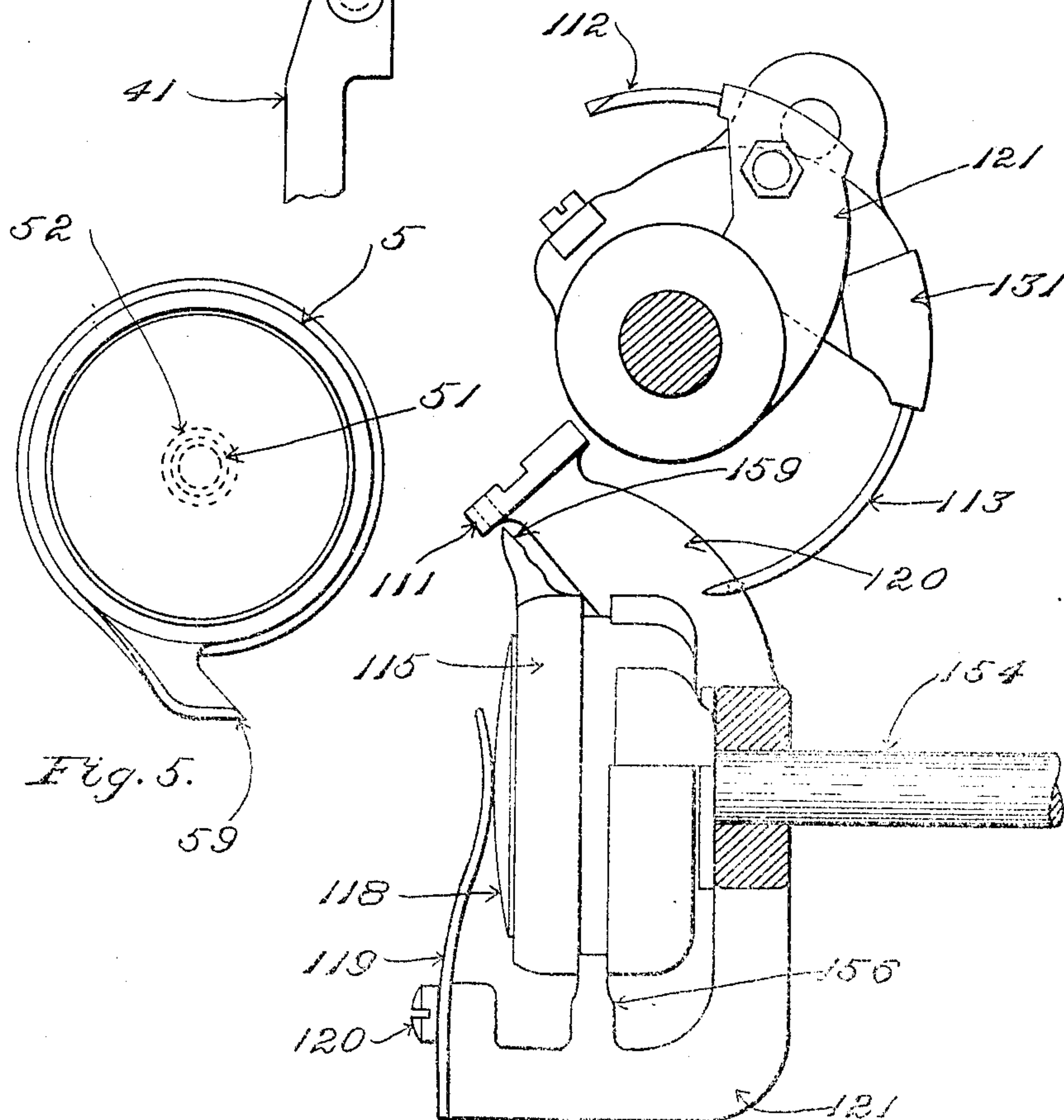


Fig. 5.

Fig. 6.

Witnesses:
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UNITED STATES PATENT OFFICE.

FRANK W. MERRICK, OF BOSTON, MASSACHUSETTS.

LOCK-STITCH SEWING-MACHINE.

No. 906,730.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed June 17, 1904. Serial No. 212,931.

To all whom it may concern:

Be it known that I, FRANK W. MERRICK, a citizen of the United States, residing at Boston, in the county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Lock-Stitch Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention consists in the combination, in a wax-thread lock-stitch sewing machine, with a hook-needle operating to draw a loop of needle-thread through the stock which is being operated upon, of a rotary shuttle, and
15 a central, or substantially central, bobbin, the said bobbin rotating only as the thread unwinds therefrom, and the shuttle-thread rendering from the said bobbin directly outward from the supply thereof which is wound
20 upon the bobbin to the stitch-forming point in the machine, between the rim of the shuttle and the marginal portion of the outer head or disk of the bobbin. The said rim is smooth and uninterrupted so as to afford a continuous
25 support for the thread in the turning movement of the shuttle, and the thread extends radially across the same directly from the surface of the supply upon the bobbin to the stitch-forming point without being threaded
30 through holes or the like and without being bent from its direct course, being only deflected by the shuttle rim.

The invention is equally applicable to machines of the straight needle type, and to machines of the curved needle type. I have illustrated both of such applications in the accompanying drawings, in which latter,—

Figure 1 shows in front elevation, with the work-support partly in vertical section, a
40 portion of a lock-stitch sewing machine employing a straight hooked needle, with an embodiment of the invention applied thereto. Fig. 2 shows the parts of Fig. 1 in plan, with the work-support, awl-bar, and awl omitted.
45 Fig. 3 shows the devices of Fig. 1 in elevation, viewing the same from the left-hand side in the latter figure. Fig. 4 is a detail view, mainly in vertical section, on a plane passing transversely through the center of
50 the shuttle at right angles to the line of feed. Fig. 5 shows the shuttle and bobbin in plan. Fig. 6 is a view illustrating the application of the invention to a curved-needle lock-stitch sewing machine.

55 Having reference, first, to the embodiment of the invention in a straight-needle ma-

chine, and to Figs. 1 to 5 of the drawings,— a portion of a post or standard forming part of the frame-work of a straight-needle sewing machine is represented at 1, Figs. 1 and 2, 60 and at 2 is represented a work-rest or work-support upon the upper end of the said post or standard 1. 3 is an awl working from above the said work-rest or work-support, and 31 is an awl-bar carrying the said awl. 65 Only a portion of the awl-bar is shown. 4 is an ordinary hooked straight-needle working from below the work-rest or work-support, and 41 is the needle-bar carrying the said needle, only a portion of the needle-bar being
70 shown. The awl-bar and needle-bar, in practice, respectively have connected therewith suitable means for reciprocating the same, and respectively are mounted in guides (not shown) as usual, in which they
75 move lengthwise in right lines. 5 is a rotary shuttle having the working position thereof below the work-rest or work-support, the loop-taking point of the said shuttle being designated 59. The said shuttle is essentially
80 cup-shaped, it being formed with a large bobbin-chamber which is surrounded by a raised annular rim, and being provided within the said chamber with a bobbin-supporting post
85 51. 52 is a bobbin which occupies the chamber and is mounted therein upon the said post. 53, Figs. 1 and 2, is a shuttle-driver, and 54, Fig. 1, is an upright shaft having the said shuttle-driver attached thereto, the said
90 shaft being mounted in bearings in the post or standard 1. In practice, the shaft 54 has connected therewith suitable means for rotating the same, not necessary to be shown. The shuttle 5 is mounted in a shuttle-race
95 comprising opposite side-pieces 6, 6, and a removable section or slide 61 between the said side-pieces, the edges of the portions 6, 6, 61, of the shuttle-race entering a circumferential groove 55, which is formed in the
100 exterior of the shuttle, and the removability of the section 61 providing for the insertion and withdrawal of the shuttle.

As thus far described, the parts are not of the gist of the invention. They may be of the illustrated construction, etc., or otherwise, as deemed desirable in practice. They
105 are caused to operate as usual in hook-needle wax-thread sewing machines. Thus, the awl passes through the stock from one side of the latter to form a hole therein. The needle
110 is passed through the said hole from the opposite side of the stock, and after having

had the needle-thread placed within its open eye by the action of the thread-guide (looper) is retracted, drawing a loop of needle-thread through the said hole. The said loop is engaged by the shuttle-point and by the rotation of the shuttle is completely disengaged from the needle, after which it is passed around and over the shuttle, whereby it is interlocked with the shuttle-thread, being then discharged from the shuttle-point and drawn up to tighten and complete the stitch.

Having reference, now, to the features in which my invention more immediately resides,—As shown in the drawings, the bobbin-chamber of the shuttle is concentric with the axis of rotation of the shuttle and the bobbin-supporting post 51 is located at the center of the said bobbin-chamber. Consequently, the bobbin 52 which is mounted upon the post 51 is centrally arranged. A bobbin-case and special thread-guiding and delivering devices in conjunction with the shuttle and bobbin are dispensed with, and the shuttle-thread is conducted from the exterior of the supply thereof which is wound upon the bobbin outward between the rim of the shuttle and the marginal portion of the upper, (*i. e.*, outer) head or disk of the bobbin, to the stitch-forming point in the machine. During the rotation of the shuttle, the portion of shuttle-thread which leads from the bobbin to the said point retains substantially the same position in space, the rim of the shuttle turning with relation thereto, and the bobbin turning on its axis only as the thread unwinds therefrom. In virtue of the central position of the bobbin with reference to the axis of rotation of the shuttle, the bobbin remains uniformly distant from the stitch-forming point in the machine during a rotation of the shuttle. In consequence of the foregoing facts, the tension of the portion of thread, *a*, Figs. 1 and 4, that extends from the bobbin to the said point is not varied during such rotation, as it is in instances in which the bobbin is mounted eccentrically in the shuttle, and in those in which the thread in issuing from the shuttle leaves the latter by a guide located eccentrically with reference to the axis of rotation and operating to cause the thread to travel in a circular path around the said axis as the shuttle rotates. The delivery of the shuttle-thread from the periphery of the central bobbin, directly outward over the edge of the rim of the shuttle from the supply thereof which is wound upon the said bobbin, and the fact that the bobbin turns upon its axis only as the thread unwinds therefrom, obviate the tendency of twist to be taken out of such thread or put into the same as a result of the rotation of the shuttle, or as a result of the unwinding of the thread from the bobbin. In the case of a shuttle that is rotated

around a center with reference to which it is mounted eccentrically, as well as in that of an axially rotating shuttle in which the bobbin or cop is mounted out of center, the tension of the thread leading from the shuttle to the stitch-forming point in the machine varies in different portions of a rotation of the shuttle. In the case of the eccentrically mounted shuttle, as well as in that of a shuttle in which there is employed in connection with the bobbin or cop a case or cover that is provided with a delivery-eye or guide through which the thread passes after leaving the bobbin a turn or twist is imparted to the shuttle-thread or taken out of the same for each rotation of the shuttle. In addition, in the case of a centrally-located cop, from the interior of which the thread is drawn, there is one turn of twist put into or taken out of the shuttle-thread for each coil which is unwound from the said cop.

At 9, Figs. 1, 3 and 4, is a spring which may be employed, if desired, to hold the bobbin from rising in the shuttle. It is a leaf-spring, attached by one end thereof to the underside of the work-support, having a depressed intermediate portion to act in connection with the upper surface of the outer (upper) head of the bobbin.

At 91, Fig. 4 is an adjusting screw by means of which the position of the movable portion of the spring may be adjusted vertically.

The invention is equally applicable either to straight-needle machines, as already described, or to curved needle machines, as in Fig. 6. In the latter figure, a work-support is indicated at 111, a curved awl at 112, an oscillating awl-carrier at 121, a curved needle at 113, and an oscillating needle-carrier at 131. These parts are or may be constructed and operated as usual in curved, hook-needle sewing machines. At 115 is a rotary shuttle coöperating with the said curved needle in the production of stitches, 159 being the shuttle-point, 152 the shuttle-driver, 154 the rotary shaft on which the said shuttle-driver is mounted, and 156 the shuttle-race. In all essential respects, as regards the invention, the shuttle and bobbin of the curved needle machine are as already described and as shown in the preceding figures. An elastic or yielding arm 119 is attached by means of the screw 120 to the portion 121 of the machine-framing. The free extremity of the said arm projects in advance of the shuttle and makes contact with the outer side of the disk 118, which may be one of the heads of the bobbin. The said arm serves to retain the said disk and bobbin in place within the shuttle.

I claim as my invention:—

In a wax-thread, lock-stitch sewing machine, in combination, a hook-needle operat-

ing to pass a loop of needle-thread through
the stock which is being operated upon, a ro-
tary shuttle by which the said loop is com-
pletely disengaged from the needle and
5 passed around the shuttle, the said shuttle
being formed with concentric open bobbin-
chamber and with a smooth uninterrupted
rim around the opening of such chamber
which rim as it revolves with the shuttle con-
10 stitutes a continuous unbroken support over
which the bobbin-thread may draw, and an
uncased central bobbin within the said cham-

ber from which the unwinding thread passes
radially across said rim to the stitch-forming
point, the said thread rendering directly out- 15
ward to and over the said rim from the pe-
riphery of the supply thereof which is wound
upon the bobbin.

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

FRANK W. MERRICK.

Witnesses:

CHAS. F. RANDALL,
EDITH J. ANDERSON.