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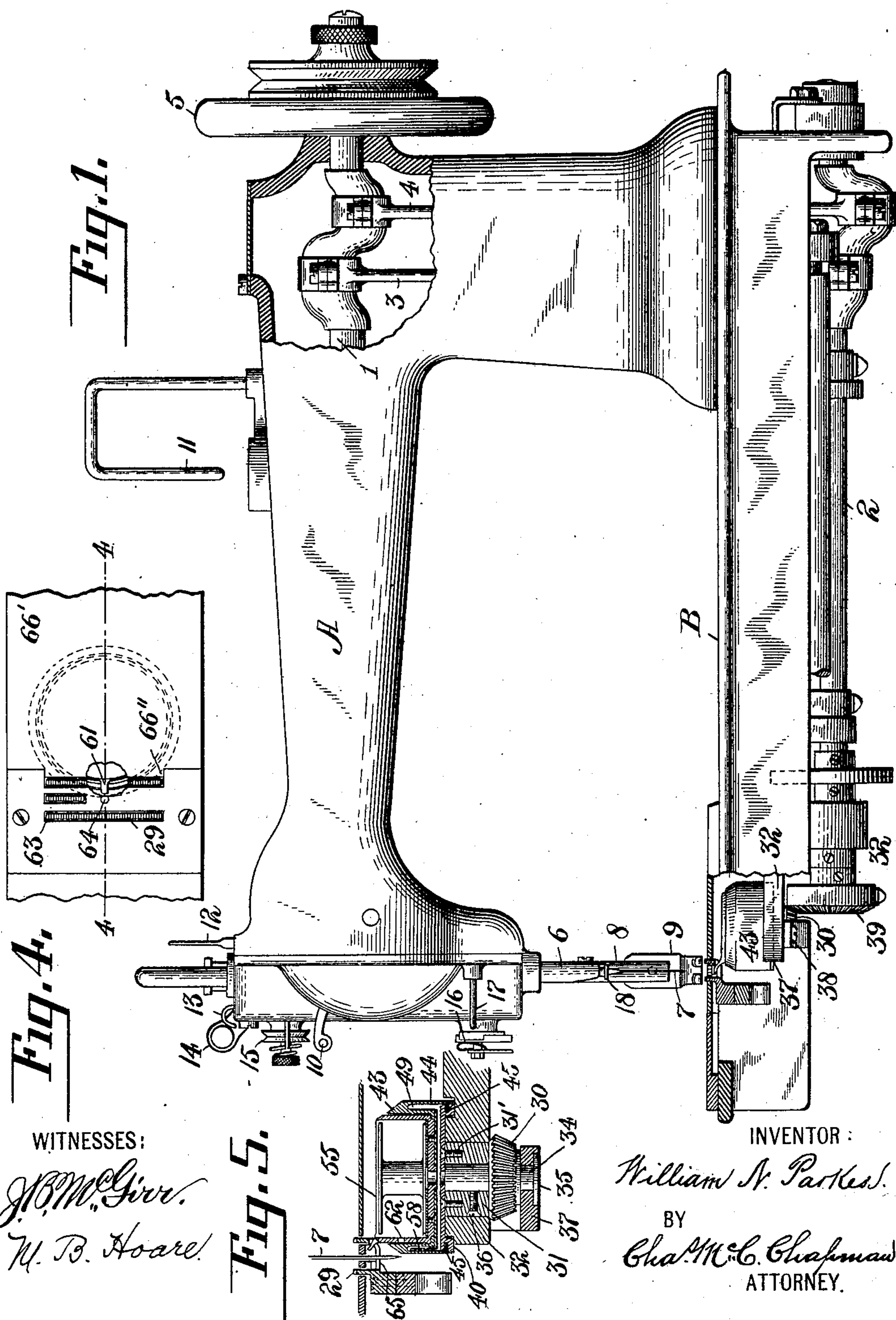
W. N. PARKES.

STITCH FORMING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED DEC. 2, 1901.

NO MODEL.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 2.

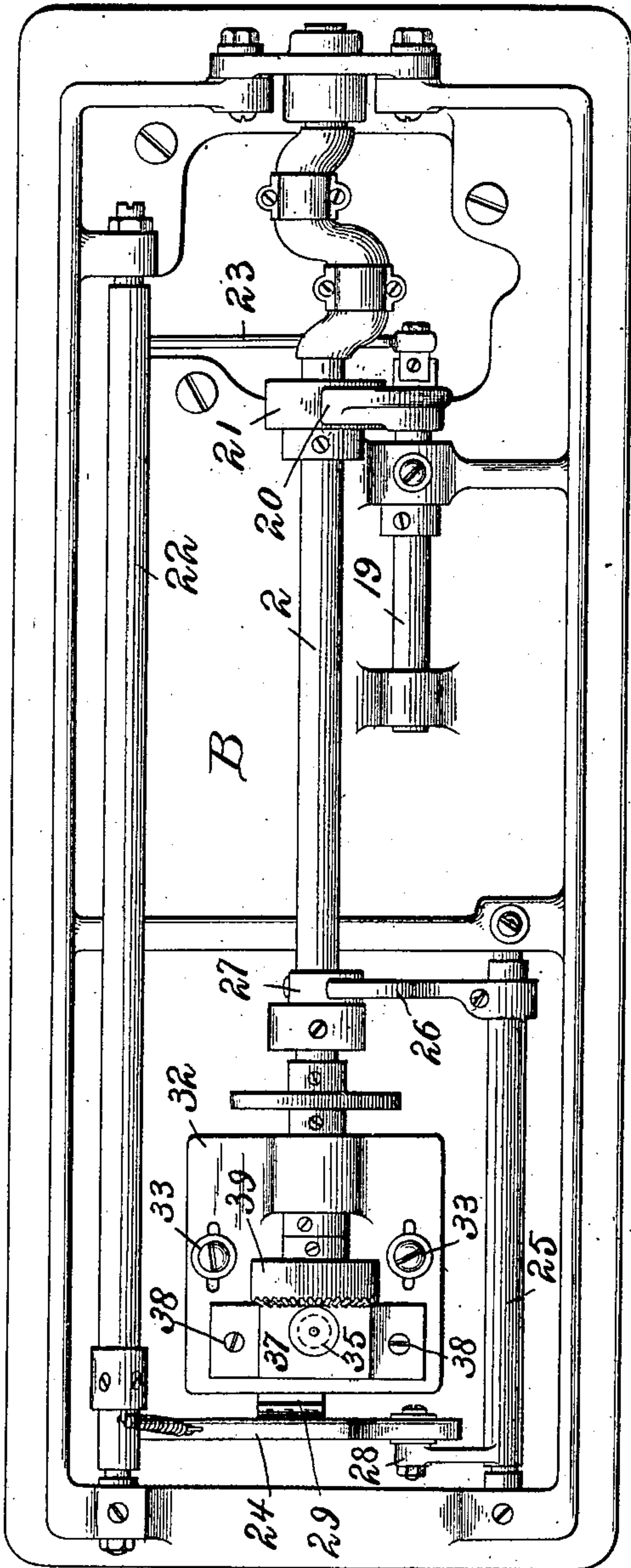


Fig. 11.

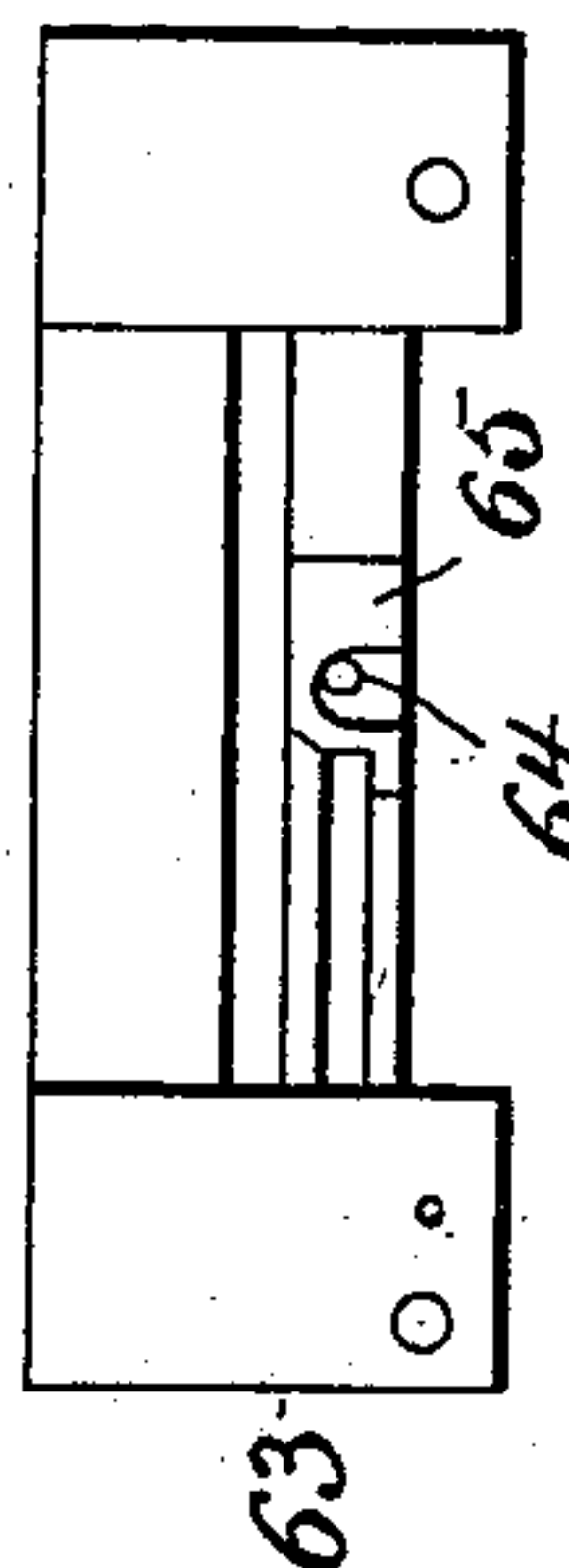


Fig. 12.



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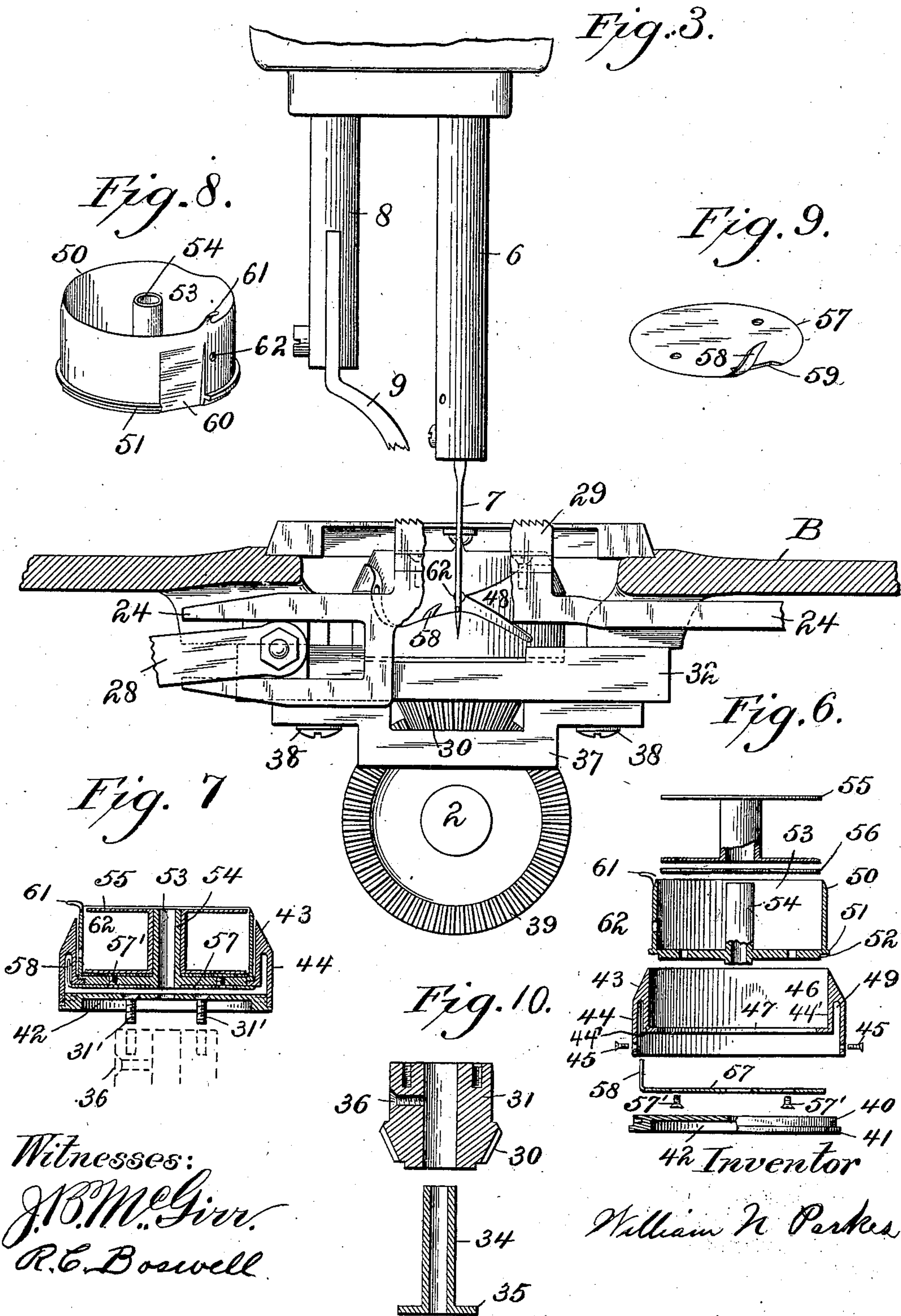
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APPLICATION FILED DEC. 2, 1901.

NO MODEL.

3 SHEETS—SHEET 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM N. PARKES, OF BROOKLYN, NEW YORK.

STITCH-FORMING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 730,692, dated June 9, 1903.

Application filed December 2, 1901. Serial No. 84,444. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. PARKES, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Stitch-Forming Mechanism for Sewing-Machines, of which the following is a specification.

This invention relates to lock-stitch sewing-machines or machines in which the loops of the needle-thread are carried around a mass of under or locking thread.

The lock-stitch machines for general use now on the market are principally of two classes, those in which a shuttle or hook which carries the under thread is oscillated or rotated, so as to engage the loops of the needle-thread and pass through them, and hook-machines in which a hook engages the loops of the needle-thread and passes them around a bobbin-case or shuttle in which the thread is held, the said case or shuttle being restrained from turning with the hook.

It is advantageous, as is well known, to use as small a quantity of the needle-thread as possible in passing the loops of it around the case which holds the locking-thread, for all of the said needle-thread, except what is used in making a stitch, has to be drawn up again through the work and through the eye of the needle. This sawing back and forth of the thread at each stitch tends to heat the needle and fray and break the thread, especially when the machine is run at a high rate of speed.

Among the points of advantage in my machine over others now on the market and known to me I might mention the following: The loops of the needle-thread are passed around over two and one-half times the quantity of under thread held in the ordinary machines and without increasing the extent of the movement of the take-up or of the quantity of thread pulled back and forth through the needle. The usual side drag on the needle-thread loop in the direction in which the loop-taker moves when engaging the same is practically eliminated, and the usual friction produced on the thread in passing the said loops around the bobbin or mass of locking-thread is very materially reduced.

The improvements I have made in this ma-

chine, as is indicated from the above, are principally in connection with the understitching mechanism and the handling of the under thread.

Referring to the drawings, Figure 1 represent a front elevation of a machine embodying my invention, parts being broken away to expose details of construction. Fig. 2 is a bottom plan view of the same. Fig. 3 is an end view of the machine, showing parts of the stitch-forming mechanism and a relative position of the needle and the looper. Fig. 4 is a plan view showing the location of the understitch mechanism in dotted outline, part of the throat-plate and cloth-plate being broken away to show the bobbin-case stop finger or lug relative to the needle-hole and the throat-plate. Fig. 5 is a sectional view on line 4 4 of Fig. 4. Fig. 6 is a sectional detail view showing the construction of the looper, the secondary hook, the bobbin-case, and bobbin in assembling relation. Fig. 7 is a sectional view of these parts assembled. Fig. 8 is a perspective view of the bobbin-case. Fig. 9 is a perspective view of the secondary hook which is carried by the bobbin-case. Fig. 10 is a detail showing the construction of a part of the hook-operating mechanism. Figs. 11 and 12 are respectively bottom and side views of the throat-plate.

In the drawings, A represents the overhanging arm, and B the cloth-plate, of the machine. A crank-shaft 1 is mounted in suitable bearings in the arm A of the machine, and a crank-shaft 2 is mounted in suitable bearings in the cloth-plate B of the machine. Connections 3 and 4 serve as means for rotating the crank-shaft 2 from the movement of the crank-shaft 1. A suitable wheel 5, attached to the rear end of the shaft 1, is provided for driving the machine from any form of belting between it and any form of driving device. A needle-bar 6, carrying a needle 7, is mounted in bearings in the forward end of the arm A and is reciprocated vertically by means of a usual connection (not shown) from the shaft 1. Back of the needle-bar in suitable bearings is mounted a presser-bar 8, to the lower end of which is attached a presser-foot 9. A take-up 10 is suitably mounted in the forward end of the arm A and is operated in a usual manner

from a take-up cam (not shown) mounted on the forward end of the shaft 1. A spool-pin 11 is provided for carrying a spool of thread. Guides 12, 13, and 14 are provided for leading the upper thread to a tension device 15. From the tension device 15 the upper thread passes under a slack-thread controller 16, thence up through the eye of the take-up 10, and down through guides 17 and 18 to the eye of the needle.

In suitable bearings on the under side of the plate B is mounted to oscillate a short shaft 19, to the rear end of which is attached a lever 20, suitably constructed and mounted to be operated by a cam 21, attached to the crank-shaft 2. An oscillating shaft 22 is mounted in suitable bearings on the under side of the plate B, and a connection 23 between said shaft and the upper end of the lever 20 serves as a means for oscillating the shaft from the lever. A feed-bar 24 is connected in a suitable manner to an arm extending upwardly from the shaft 22, so as to be reciprocated longitudinally by the said shaft. A short shaft 25 is mounted in suitable bearings, and to one end of the same is attached an arm 26, which is in engagement with a cam 27, attached to the crank-shaft 2. On the other end of the shaft 25 is formed an arm 28, which engages the forked end of the feed-bar 24. A feed-dog 29 is suitably formed on or attached to the bar 24, so that the toothed face of the same is substantially in a horizontal plane. The cam 27 and the connection between the same and bar 24 operate to move the said bar in a vertical plane and through it to give the feed-dog 29 the usual up-and-down movement. The cam 21 and the connection between the same and the bar 24 operate to give the feed-dog 29 the usual forward-and-backward movement.

The mechanism so far described is of a usual form for operating the needle, the take-up, &c., and for operating the feed-dog and forms no part of my invention, and it is to be understood that any usual form of mechanism for operating the needle, take-up, and feed may be used in combination with my understitch-forming mechanism, which I will now describe.

A gear-wheel 30, which is provided with a hub 31, is mounted in a bearing 32, which is attached, by means of screws 33, to the under side of the plate B. A short vertical shaft 34, having a head 35 formed thereon, extends through the gear 30 and the hub 31 of the same and is rigidly attached thereto by means of set-screws 36, one of which is not shown. A bearing 37 is attached to the bearing 32 by means of screws 38, and in the said bearing is located the end 35 of the shaft 34. A running bearing for the gear 30 is thus formed above and below the same, together with means which retain it in its proper position. To the forward end of the shaft 2 is attached a gear-wheel 39, which meshes with the gear 30. The gear 39 is twice the circumference

of the gear 30, and therefore turns the latter twice while it turns once. To the hub or extension 31 is attached, by means of screws 31', a disk 40, having a circumferential rib or extension 41 formed thereon, said disk being cut out on its under side, as at 42, Fig. 6. To the disk 40 is attached a looper 43, which has a downwardly-extending wall 44, connected with the disk 40 by means of screws 45. A cavity 46 is formed in said looper, and around the bottom of the wall of the cavity is formed a ledge or flange 47. The wall of the looper is cut away and a loop-taking hook or beak is formed on it, as shown in Fig. 3. A groove or channel 49, Fig. 6, is formed intermediate the wall of the cavity 46 and the wall 44 of the looper 43—that is to say, the body of the looper is channeled concentrically, as at 49, clear to the point of the hook or beak, so as to provide the two walls 44 and 44', the latter of which is shorter and provided with the circumferential flange 47. This channel or groove is quite deep, and such depth extends parallel with the axis of the looper and provides a space in which runs and operates the secondary hook 58 of the bobbin-case. It will thus be seen that the hook or beak of the looper is bifurcated and that the secondary hook is so located and disposed as to operate within said bifurcation, thus causing both the hook of the looper and the secondary hook to operate in a vertical plane parallel with the path of reciprocation of the needle. This will be hereinafter further explained and its functions and advantages noted. In the cavity 46 is located a bobbin-case 50, which has a peripheral rib 51 formed thereon, and a portion 52 formed on its under side. In the cavity 53, in the bobbin-case and extending upwardly from the bottom of said cavity, is a post 54, on which a bobbin 55 is adapted to turn. The bottom of the bobbin-case is preferably lined with leather or some other suitable frictional material 56, on which the bobbin 55 rests. To the underside of the bobbin-case 50 a secondary hook plate or disk 57 is attached by means of screws 57', and on the said hook-plate is formed a secondary hook or beak 58, which inclines slightly, as shown in Fig. 9. The hook or beak 58 is of such form and length that it extends nearly to the top of the groove 49 in the looper 43, the said groove being of such extent or depth that the point of the hook or beak 58 enters the loop-taking hook 48 at or near the point of the latter. In the periphery of the hook-plate 57 a portion is cut away, as at 59, and in the bobbin-case 50 and through the rib 51 a portion of like extent is cut away, as at 60, Figs. 8 and 9. On the upper edge of the bobbin-case 50 is formed a stop finger or lug 61, and substantially under the same, midway between the top and the bottom of the bobbin-case, is formed a thread-delivery eye 62.

A needle or throat-plate 63, having a needle-hole 64 in it, is formed to permit the feed-

dog 29 to operate. A boss 65 is formed on the under side of the throat-plate 63 and is cut away, so as to form a channel or notch 66, which passes into the needle-hole 64.

5 A slide 66', having an extension 66'', cooperates with the throat-plate and helps to form one of the feed-slots. Said slide by being removable also serves to permit ready access to the looper mechanism. The extension 66''
10 practically forms a part of the throat-plate 63, and the slide thus constructed permits of the large bobbin I use being readily removed when the said slide is open.

When the machine is assembled, the stop-
15 finger 61 of the bobbin-case 50 is located in the notch 66, and thus the bobbin-case is held from rotating with the hook 43. The notch is of sufficient extent to permit the free passage of the thread around the finger 61. This
20 notch or way acts as a guide, in combination with the finger 61, for the loop of the needle-thread as it passes from the hook to the work.

Having thus set forth the details of my invention, I will now describe the operation of
25 the same and the manner in which a stitch is formed by the mechanism shown.

The looper has two rotations to one reciprocation of the needle and take-up. This ratio of movement is for the purpose of more
30 rapidly passing the loop of needle-thread around the mass of under thread, so that other parts of the stitch-forming mechanism may have plenty of time in which to perform their operations and secure their functions
35 after the looper has taken the needle-loop and cast it about the bobbin-case, and the rapid movement of the looper enables the latter to take the loop quickly from the needle, cast it rapidly about the bobbin-case, and
40 be out of the way of the thread so the take-up may perform its functions without interference. One rotation of the looper is obviously idle in so far as the engagement of the looper with the needle-thread is concerned.
45 The bobbin-case is held from rotation by the means described, and both the looper and bobbin-case are disposed in a horizontal plane, though obviously this is not essential to the proper operation of the stitch-forming mechanism, for the objects and functions thereof
50 can be equally well secured by disposing the said mechanism in any manner. The bobbin-case is supported by and contained in the looper, as previously stated. Hence this
55 disposition of parts and described construction provide a compact structure and produce a stitch-forming mechanism with which can be used a bobbin or cop of thread more than two and one-half times larger than those used
60 in other machines of similar character and also permit the use of a much larger bobbin-case without increasing the size of the looper or the quantity of needle-thread used in the loop passed about the bobbin-case. It should
65 be noted that the stroke of the take-up is not increased nor is the quantity of thread drawn through the needle in the stitch formation.

The under thread is drawn directly from the supply through the thread-eye 62 and led directly to the work past the finger 61. The
70 needle descends, as shown in Fig. 3, outside the body of the looper, throws out its loop toward the looper, and the beak 48 of the looper enters the same and immediately thereafter carries it into engagement with the secondary
75 hook carried by the bobbin-case, which enters the groove in the hook of the looper at or near the point and, by reason of its disposition and the inclined under edge of the hook of the looper, rapidly carries the loop of needle-
80 thread into the base of the throat of the looper, which is substantially the plane of the base of the bobbin-case. It may be noted at this point that the rapid manipulation of the loop just described, causing it to quickly reach
85 the base of the looper-hook, is one of the elements which helps to reduce the quantity of needle-thread necessary to pass about the bobbin-case or mass of under thread of any given size. The inner strand of the loop com-
90 mences to swing under the bobbin-case and the outer strand over the top thereof much sooner, and consequently this adds another element to help reduce the size of the loop and quantity of the thread passed about the
95 bobbin-case and also affords a reason for the absence of side drag of any consequence on the needle-loop. The continued movement of the looper causes the inner strand of the loop to pass beneath the bobbin-case, while
100 the other strand is bent over the periphery of the looper and across the top of the bobbin. When the looper has described substantially a half-rotation, the take-up begins to operate to draw in the loop and set the
105 stitch.

It may be noted that though in this specification I have employed the term "bobbin" with reference to the mass of locking-thread I do not intend to be restricted to the techni-
110 cal meaning of such term, for it will be obvious that a cop of thread or a mass thereof in any other form can be used, and I desire it to be understood that the term "bobbin" shall comprehend any mass of thread capable
115 of use in the connection stated. Moreover, it is to be noted that the secondary hook operates directly within the body or bifurcation of the loop-taking hook of the looper, and this in contradistinction to operating within
120 the boundary of the bobbin or thread-cavity of the looper. Hence no interference of operating parts occurs, the needle-loop is accurately and quickly passed about the mass of locking-thread, and said loop of needle-
125 thread is so manipulated as to draw a minimum amount through the needle-eye.

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

1. A stitch-forming mechanism comprising a looper having a loop-taking hook, the latter being provided with a channel in its wall extending to the point, or beak, thereof and

the width, or depth, of which channel extends parallel with the axis of the looper, and a device within said looper having a secondary hook which operates in said channel and engages the inner strand of a loop and aids in passing the latter about said device.

2. A stitch-forming mechanism comprising a looper having a loop-taking hook formed integral therewith and in continuity of the wall thereof, said hook being provided with a channel in its wall extending to the point, or beak, thereof and the width, or depth, of which channel extends parallel with the axis of the looper, and a device within said looper having a secondary hook operating in said channel and which engages the loop and aids in passing the latter about said device.

3. A stitch-forming mechanism comprising a looper having a loop-taking hook, and also a concentric groove in the wall thereof; a device supported by and wholly within the circumference of said looper and having a secondary hook operating within said groove; means for causing said parts to cooperate whereby said hooks will aid in passing the needle-loops about said device.

4. A stitch-forming mechanism comprising a looper having a loop-taking hook, and also a concentric groove in the wall thereof the depth or width of which extends parallel with the axis of the looper; a bobbin-case supported within the body of the looper and having a secondary hook operating within said groove; and means for causing said parts to cooperate in passing a loop about said device.

5. A stitch-forming mechanism comprising a looper having a wall and a loop-taking hook thereon; a device located wholly within the wall of said looper, said device having a secondary hook located and operating in the path of the loop-taking hook; means wholly within the wall of the looper for supporting said device, and means for causing said hooks to cooperate in passing a loop about said device.

6. A stitch-forming mechanism comprising a looper having a wall provided with a loop-taking hook thereon and a loop-receiving throat therein; a device located wholly within the wall of said looper, said device having a secondary hook located and operating in the path of the loop-taking hook; means wholly within the wall of the looper for supporting said device; and means for causing said hooks to cooperate whereby the loop taken by the hook of the looper is carried into the throat thereof and passed about said device.

7. A stitch-forming mechanism comprising a looper having a wall and a loop-taking hook thereon; a device located wholly within the wall of the looper, said device having a secondary hook located and operating in the path of the loop-taking hook, and said hooks pointing in substantially opposite directions; means wholly within the wall of the looper for supporting said device; and means for

causing said hooks to cooperate in passing a loop about said device.

8. A stitch-forming mechanism comprising a looper having a loop-taking hook, and the wall of its body in rear of said hook provided with a concentric groove; a device carried by said looper having a secondary hook located in the path of the loop-taking hook and operating within the said groove; and means for actuating one of said parts and for holding the other from rotation.

9. A stitch-forming mechanism comprising a looper having a loop-taking hook; a device carried by and supported within the body of the looper, said device having a secondary hook arranged between the outer wall of the looper and the body of said device; means for actuating one of said parts and for holding the other from rotation whereby when a loop is entered by said loop-taking hook the inner strand thereof will be engaged by said secondary hook, resulting in rapidly passing the loop about said device.

10. A stitch-forming mechanism comprising a looper arranged in a horizontal plane and having a vertically-grooved wall provided with a loop-taking hook; a device carried by and located within the body of said looper, said device having a secondary hook located in the path of the loop-taking hook and operating within the grooved wall; and means for actuating one of said parts and for holding the other from rotation, whereby one of the hooks will carry the loop into engagement with the other and cause the loop to be rapidly spread and carried about said device.

11. A stitch-forming mechanism comprising a looper arranged in a horizontal plane and having a loop-taking hook; a needle reciprocating in a path beside the body of the looper; a device carried by said looper and having a secondary hook located in the path of the loop-taking hook and operating within the body thereof; means for actuating said needle and looper, and means for holding said device from rotation.

12. A stitch-forming mechanism comprising a rotary looper arranged in a horizontal plane and having a loop-taking hook; a needle reciprocating in a path beside the body of the looper; a device carried by said looper and having a secondary hook located in the path of the loop-taking hook and operating within the body thereof; means for holding said device from rotation and means for actuating said needle and looper with a ratio of one reciprocation of the former to two rotations of the latter.

13. A stitch-forming mechanism comprising a looper having an internal circumferential and laterally-extending flange; a bobbin-case supported within said looper by means of a laterally-extending circumferential flange resting upon the flange of the looper, and retained therein by means of a plate secured to said bobbin-case and located beneath the flange of the looper.

14. A stitch-forming mechanism comprising a looper having an internal circumferential and laterally-extending flange; a bobbin-case supported within said looper by means of a
5 laterally-extending circumferential flange resting upon the flange of the looper, and retained therein by means of a plate secured to said bobbin-case and located beneath the flange of the looper, said bobbin-case having
10 a secondary hook which operates within the circumference of the looper.

15. A stitch-forming mechanism comprising a looper having an internal circumferential flange; a bobbin-case composed of a plurality
15 of separable parts which, when connected, form a groove into which the flange of the looper extends and by which said looper and case are held operatively grouped.

16. A stitch-forming mechanism comprising
20 a looper having an internal circumferential flange; a bobbin-case composed of a plurality of separable parts which, when connected, form a groove on the bottom of the case and into which the flange of the looper extends,
25 thereby holding said looper and case operatively grouped.

17. A stitch-forming mechanism comprising a looper having an internal circumferential flange; a bobbin-case composed of a plurality
30 of separable parts which, when connected, form a groove into which the flange of the looper extends and by which the looper and bobbin-case are operatively grouped; and a secondary hook carried by one of the parts
35 of the bobbin-case and operating within the circumference of the looper.

18. A stitch-forming mechanism comprising a looper having an internal circumferential flange and an internal groove, the depth or
40 width of which extends at an angle to said flange; a bobbin-case having in the body thereof a groove which receives the said flange, and also having a secondary hook which extends into and operates within said groove in
45 the looper.

19. A stitch-forming mechanism comprising a looper having an internal flange; a bobbin-

case having an extension formed on the bottom thereof of less diameter than said case, and also having a plate of substantially the
50 same diameter as said case detachably secured to said extension, thereby forming a groove for receiving the looper-flange and holding the looper and case operatively
55 grouped.

20. A stitch-forming mechanism comprising a looper having an internal flange and an internal groove the depth or width of which extends at an angle to said flange; a bobbin-
60 case having an extension formed on the bottom thereof of less diameter than said case, and also having a plate of substantially the same diameter as said case detachably secured to said extension and forming a groove
65 for the reception of said flange; and a secondary hook carried by said plate, extending into and operating within said groove, whereby the parts are held operatively and compactly grouped.

21. A stitch-forming mechanism comprising
70 a looper having an internal flange, and an internal groove the depth or width of which extends parallel with the axis thereof; a bobbin-case having means for supporting the same upon said flange, and also having a sec-
75 ondary hook which extends into and operates within said groove.

22. A stitch-forming mechanism comprising a looper composed of a plurality of separable parts forming between them a receptacle, and
80 one of said parts having a flange; a bobbin-case composed of a plurality of separable parts and forming between them a groove for the reception of said flange, whereby the looper and bobbin-case can be properly as-
85 sembled and held operatively grouped.

Signed at New York, in the county of New York and State of New York, this 30th day of November, A. D. 1901.

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Witnesses:

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