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W. N. PARKES.

LOOPER MECHANISM FOR SEWING MACHINES.

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Fig. 1.

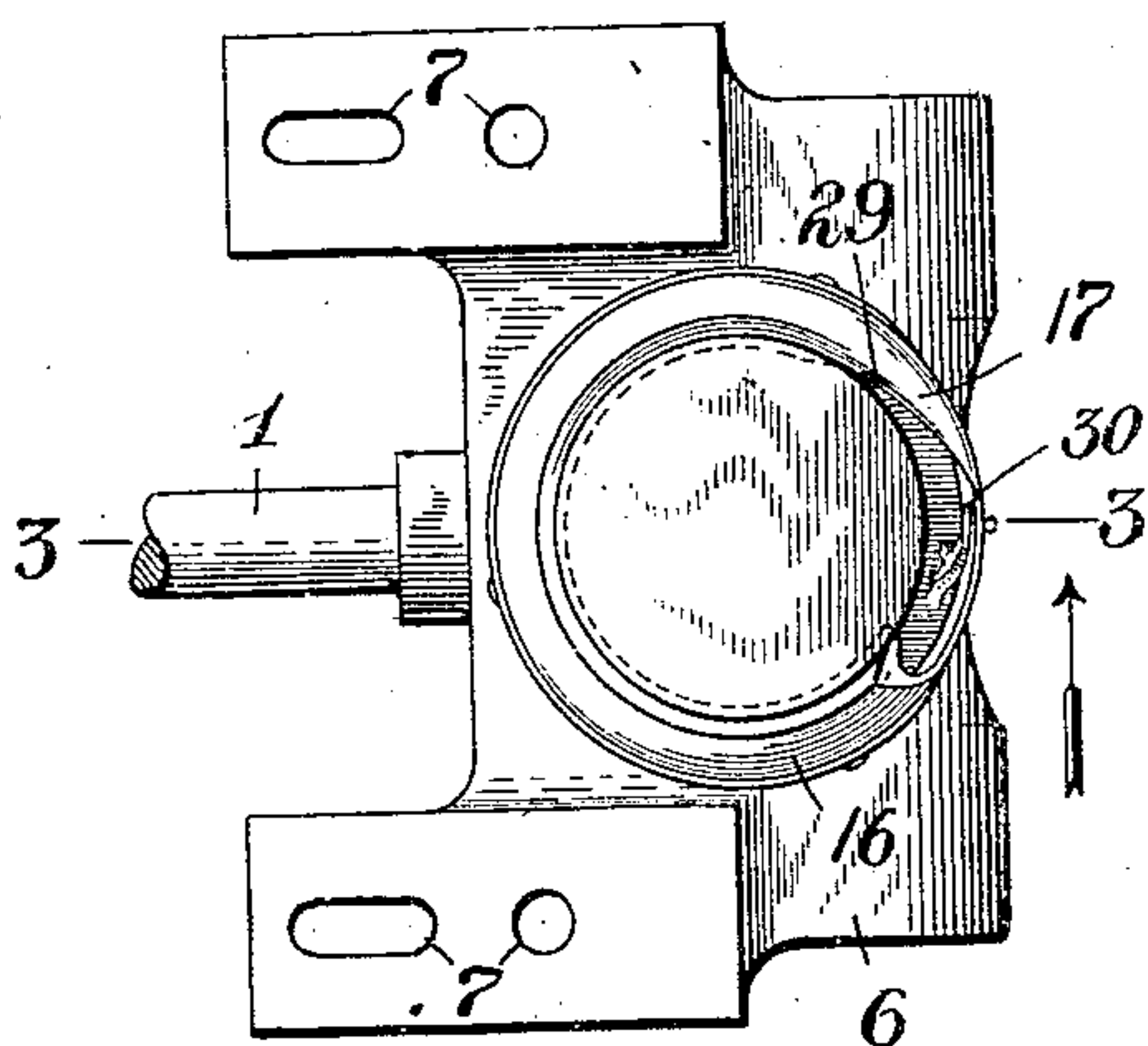


Fig. 2.

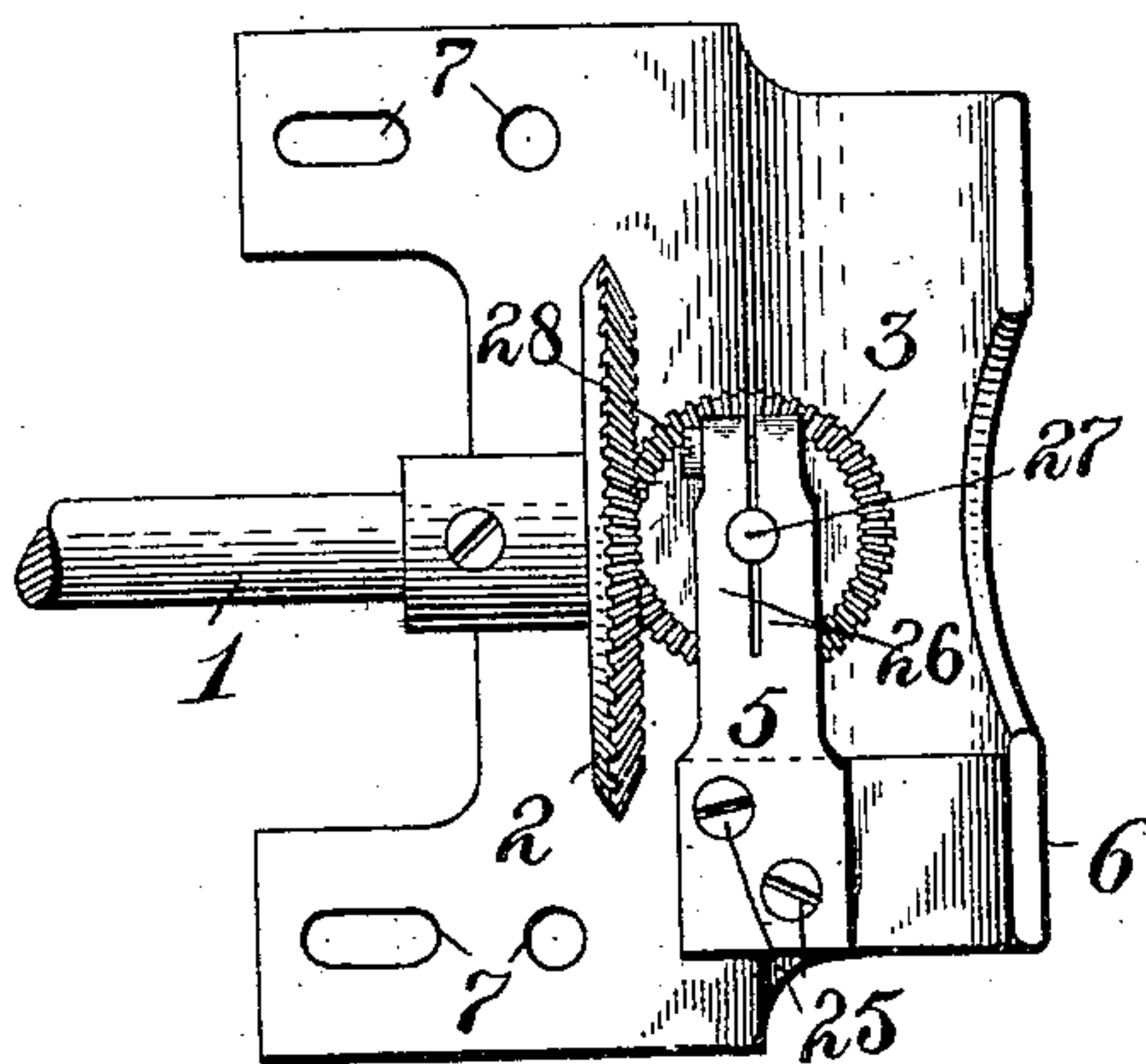


Fig. 3.

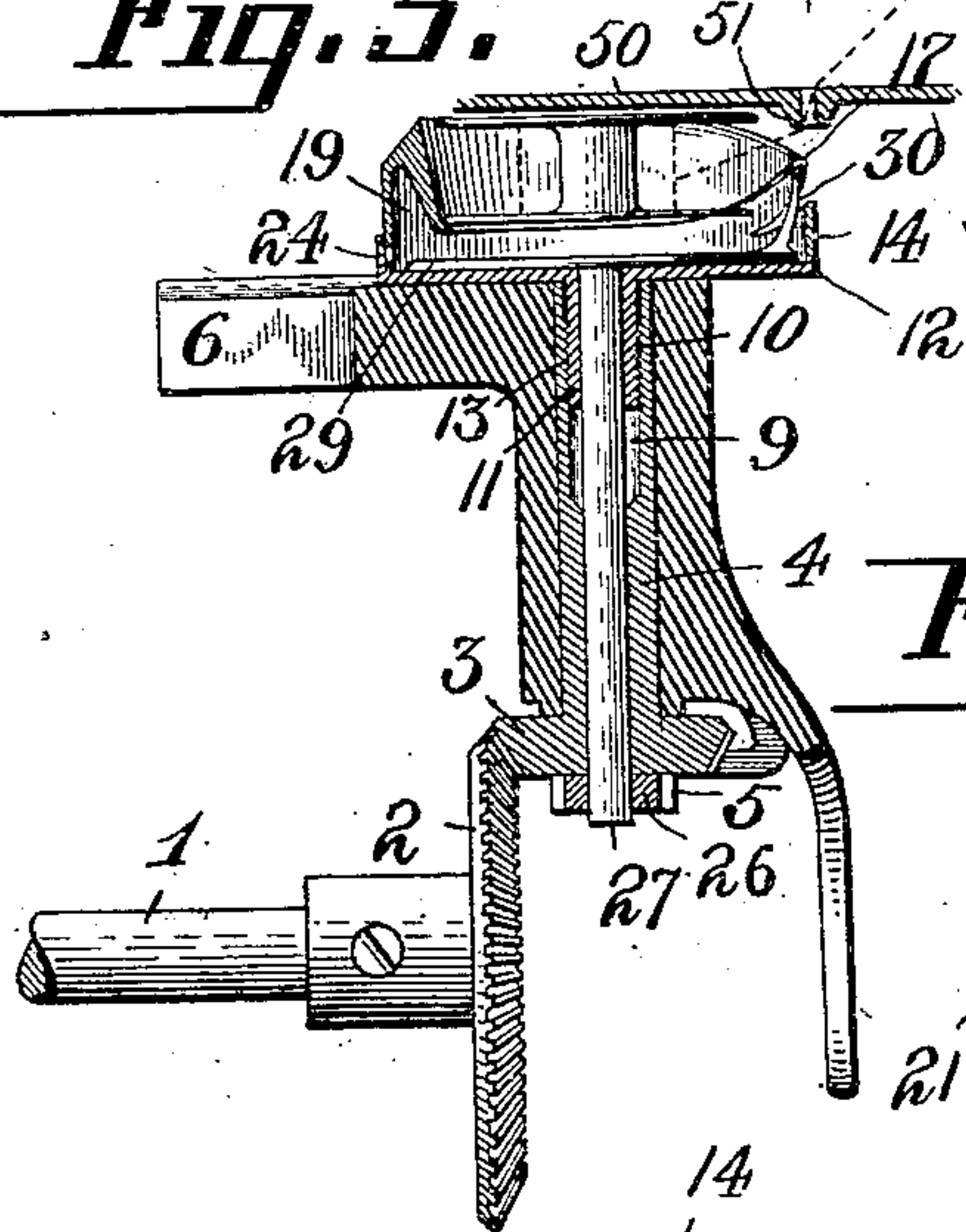


Fig. 7.

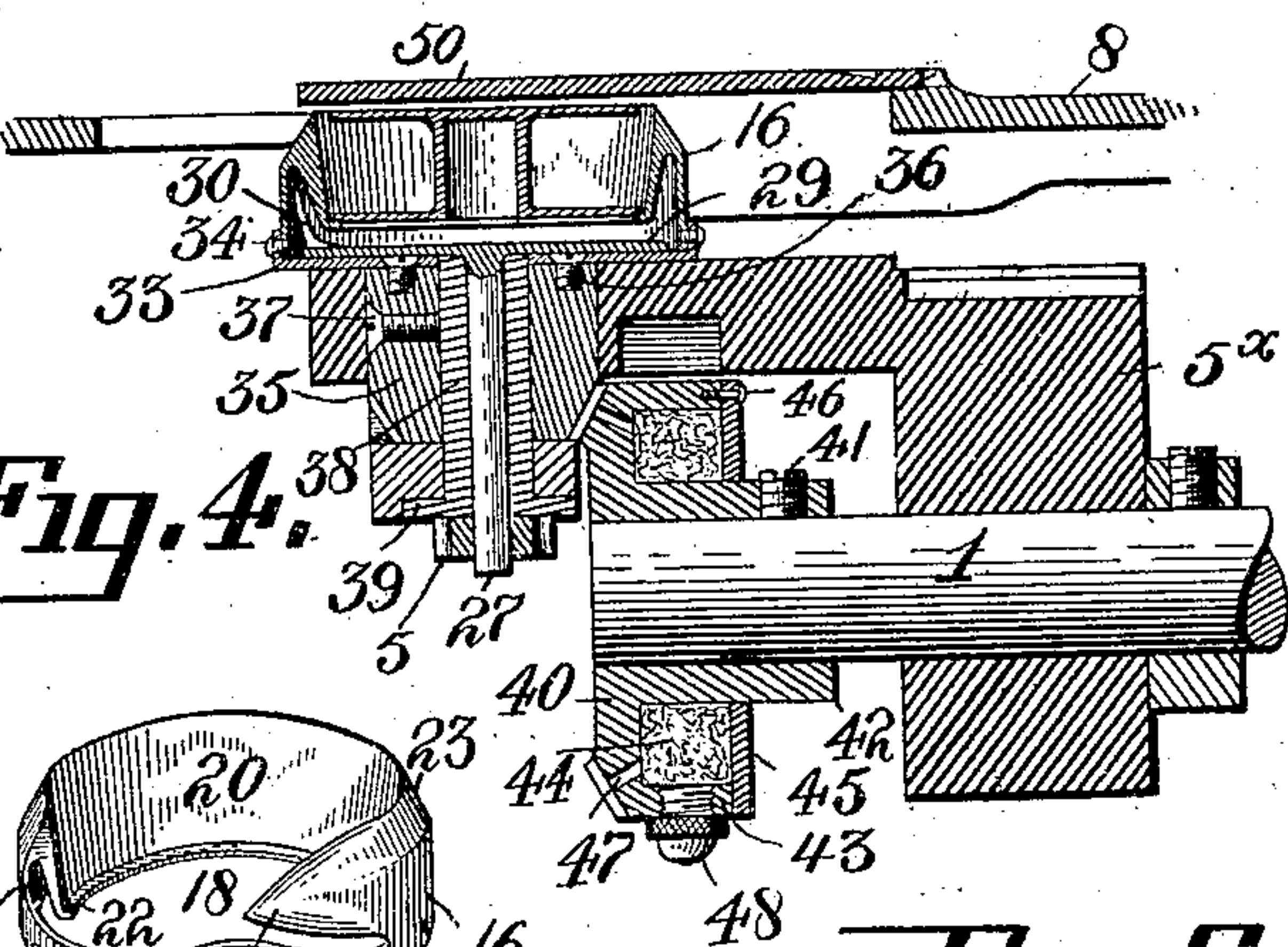
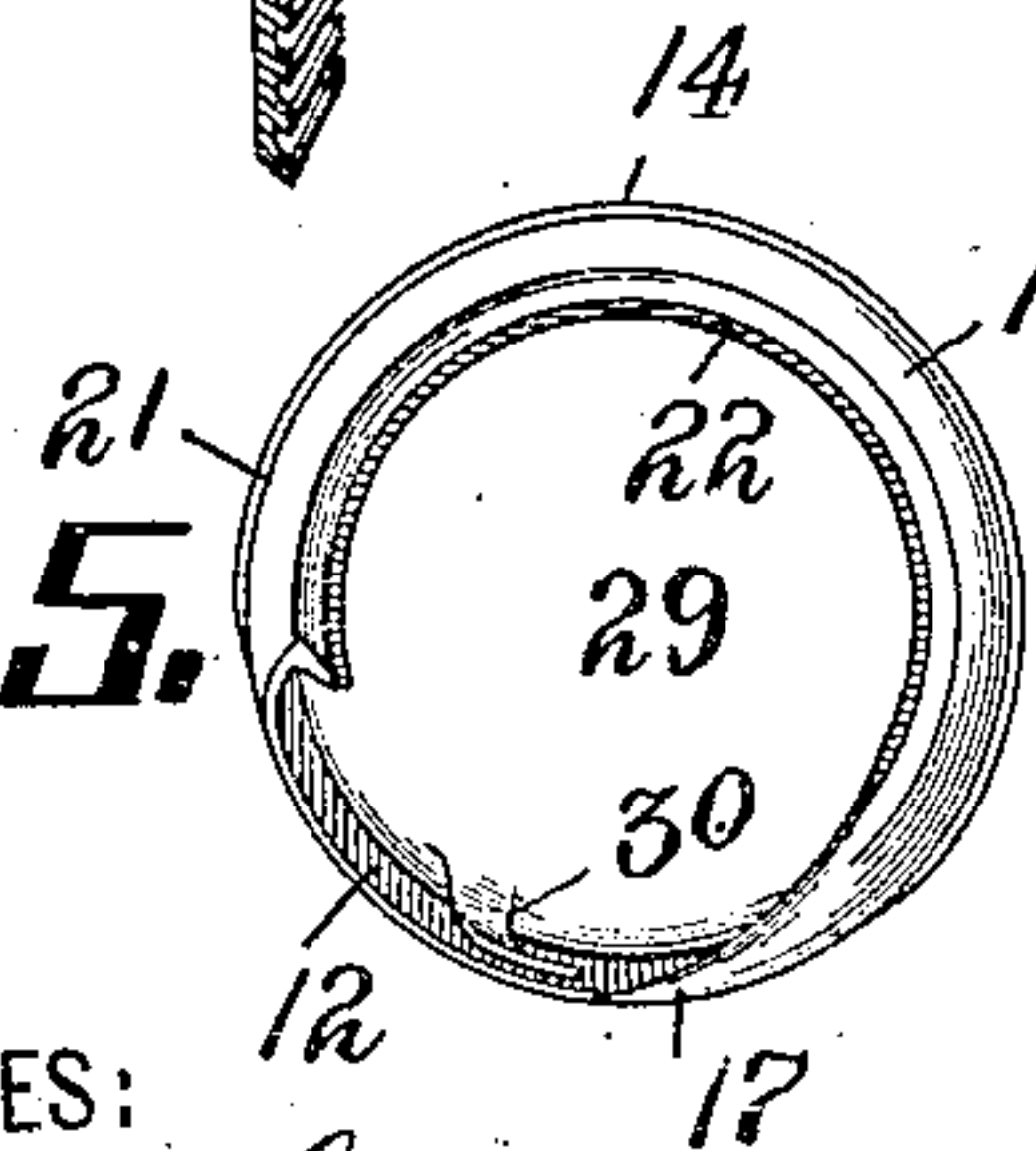


Fig. 4.

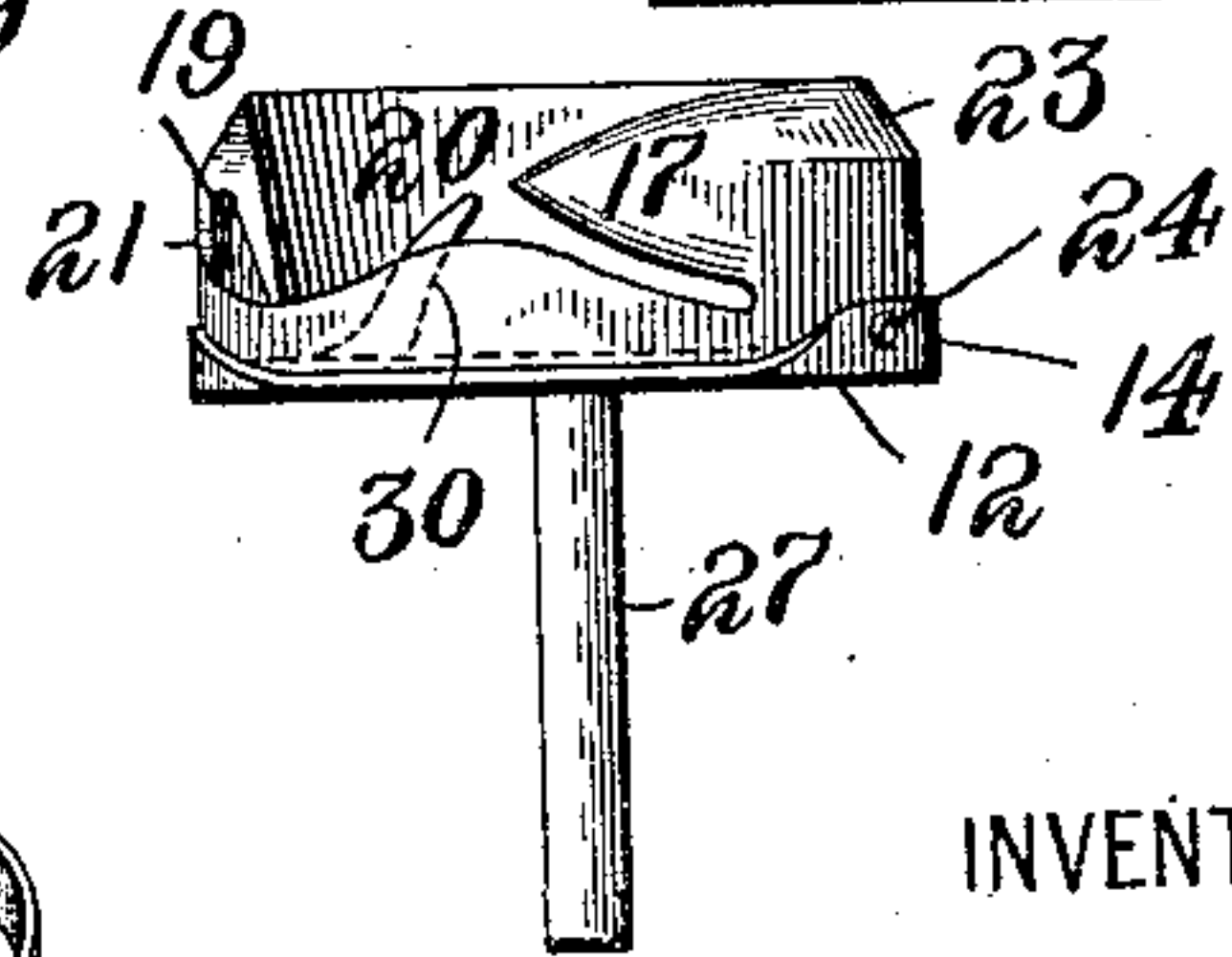
Fig. 5.



WITNESSES:

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Fig. 6.



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# UNITED STATES PATENT OFFICE.

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## LOOPER MECHANISM FOR SEWING-MACHINES.

No. 875,612.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed April 27, 1903. Serial No. 154,456.

*To all whom it may concern:*

Be it known that I, WILLIAM N. PARKES, a citizen of the United States, residing in Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Looper Mechanism for Sewing-Machines, of which the following is a description.

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.

In the lock-stitch machines, now in general use, especially for manufacturing purposes, the bobbin is held in a bobbin-case or holder, which case in turn is mounted in a race formed in a revolving or oscillating hook or shuttle. The case is kept from turning with the hook by a finger, extending from the same, contacting with an immovable part of the machine, and the thread is forced to make a path for itself between the said finger and immovable part, thus putting drag upon the thread. Moreover, if the race is not oiled properly, an additional drag is placed on the said loop, and additional wear on the parts. In keeping this race oiled, the thread at times becomes soiled, also at times loose thread, or ends of thread, become wedged in the race, causing trouble and a reduction in the production of the machine.

The machines, known to applicant, that have been or are now on the market and in which no bobbin-case is used, have many defects, among which may be mentioned: that the bobbin rests on the edges of its heads or flanges in a vertical plane, and the loop of the needle-thread has to bodily lift the bobbin to make a path for itself in passing around it; no means are provided for keeping the limb of the loop, that passes back of the bobbin, from drawing on the latter, the result being a lateral drag on the bobbin as well as a bodily lifting of the same. By reason of these, and other defects, a very small bobbin is used and the speed of the machine is very much limited.

As is well known, it is advantageous to use as small a quantity of the needle-thread as possible in passing the loops thereof around the mass of under or locking-thread, for all of the said needle thread, except that portion which enters into the stitch, has to be drawn up 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, and especially when the machine is run at a high rate of speed.

The primary objects of this invention are to produce a practical, high-speed lock-stitch sewing-machine which has not a bobbin-case nor a shuttle-race; a machine in which the loops of the needle-thread are passed directly around the bobbin, with no intermediate case or holder between the same and the loop-taker or hook, thus permitting a very large bobbin to be used; a machine in which a secondary hook is used for accelerating the passing of the loops of the needle-thread around the said bobbin; a machine in which a device or hook is provided which coöperates with the primary loop-taker or hook to hold the inner or lower limb of the loop down below the bobbin as the loop is passing around the same, thus preventing the drag of the loop on the bobbin and the lifting of the bobbin by the said loop; and a machine in which the bobbin bears on a moving part, and in which the friction between the said moving part and the bobbin is utilized to produce a tension on the thread.

It is a further object of this invention to provide a looper for lock-stitch sewing-machines, which is capable of containing, or holding, a large quantity of locking-thread and which will pass the loop of needle-thread around the mass of locking-thread without a proportionate increase in the size of the needle loop.

Another object of this invention is to provide a lubricating means by which the driving-gear for the looper-mechanism may be constantly oiled or lubricated, thus reducing noise during operation of the looper-mechanism and enabling the speed to be greatly increased without undue wear or heat.

With the above objects in view, and others which will appear during the course of this description, my invention consists in the parts, features and combinations hereinafter described and claimed.

In the drawings: Figure 1 is a plan view of the looper mechanism and its supporting bracket; Fig. 2 is a bottom view of the same, showing a means for holding the secondary hook stationary; Fig. 3 is a vertical section of the mechanism shown in Fig. 1, on the line 3—3 of said figure, looking in the direction of the arrow and including the throat-plate; Fig. 4 is a detail perspective view of the



several parts of the looper detached and in assembling relation; Fig. 5 is a plan view of the looper and secondary hook assembled; Fig. 6 is a front view of the parts of Fig. 5; and Fig. 7 is a vertical sectional view of another form of the looper mechanism, showing also the lubricating device.

It may be noted that though, in this description, I will refer to the "bobbin" which holds the locking-thread, I do not intend to be restricted to the technical 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 of use in the connection stated.

The looper driving shaft is indicated by 1, and carries on its forward end the bevel gear 2, which meshes with a similar bevel gear 3, integral with, or otherwise connected to, an elongated tubular shaft 4, said gear resting upon arm 5, secured to a bracket 6, provided with apertures and slots 7, by means of which said bracket may be secured to any suitable portion of the frame or cloth-plate 8, of the machine. The bevel gear 2, is approximately twice the size of the bevel-gear 3, thus producing a ratio of two-to-one between the looper and its driving shaft, and between the looper and the needle, which latter is, as ordinarily, driven by any suitable connecting means from the shaft 1.

The interior of the upper end of the shaft 4, has an enlarged bore 9, screw-threaded as shown at 10, for the reception of a tubular spindle 11, carried by a disk 12, said spindle having external screw-threads 13, for coöperating with the screw-threads 10, of the shaft 4. This connection is found convenient and affords a ready means for supporting the parts. The disk 12, is provided with a flange 14, a portion of which is cut out or omitted at 15. The looper-body 16, is provided with a loop-taking hook or beak 17, and is formed substantially circular, providing a cavity 18. A groove or channel 19, is formed in the body of the looper between the wall 20, of the cavity and the wall 21, of the looper body. In the drawings, the wall 20, of the looper is shown slightly inclined, but this structure is not essential; for the wall 20, may be made substantially vertical, and have the advantage of providing a means to prevent the bobbin from tilting. The channel or groove 19, 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, presently to be described. The concentric channel 19, extends substantially around the looper and clear to the point of the hook or beak, thus forming the two walls 20 and 21, the former of which is shorter and provided with the laterally extending flange or ledge 22, for

supporting the bobbin. The channel 19, is shown converging from its open side to its closed side; but, this is not essential, inasmuch as it is only necessary that a proper and sufficient channel be provided in which may operate the secondary-hook.

The body of the looper is preferably beveled or slabbed at 23, thus decreasing the area over which the outer strand of the needle-loop is carried and assisting the loop to readily discharge from the hook. The wall 21, of the looper provides a means by which the same may be detachably connected to the flange 14, of the disk 12, by means of the screws 24. The arm 5, is detachably connected to the bracket 6, by means of screws 25, and said arm, at its forward end is split or provided with a saw-cut, affording two arms 26, which are suitably clamped about the spindle 27, by means of the screw 28, the spindle thus being held from movement. At its upper end the spindle 27, has connected thereto, or formed therewith, a disk 29, carrying a secondary-hook 30, extending therefrom and slightly inclined thereto. This inclination of the hook is not essential, it being only necessary that the hook be so located and of such extent as to properly engage the loop of needle-thread taken and carried thereagainst by the hook of the looper. The face of the secondary-hook extends substantially straight down to the surface of the disk 29, thus providing a notch or angle 31, for the reception of the needle-loop. By the means described, it will be clear that the secondary-hook, the disk 29, and the spindle 27, are held stationary and that the position of the disk and secondary-hook may be adjusted vertically and circularly so as to place said secondary-hook in proper position relatively to the loop-taking hook and also to locate the disk 29, relatively to the disk 12, so as to avoid friction between the two. The bobbin rests, normally, horizontally, with one of its disks upon the flange 22, of the looper and is thus held above the bottom of the looper and from contact with the stationary disk 29. This is clearly shown in Fig. 3; but, it will be obvious that the distance shown between the bobbin and the stationary disk is not of importance, inasmuch as it is only necessary to provide sufficient clearance between the two for the inner strand of the loop of the needle-thread in the passage of said loop around the bobbin. The notch 31, at the base of the secondary-hook is intended for the reception of the loop of the needle-thread and insures its complete depression below the plane of the locking-thread. Obviously, the mass of thread, in any other form, would be supported upon a disk, resting normally upon the flange 22.

The operation of the parts thus far described is as follows: The secondary-hook is held stationary; the bobbin, normally, is



freely supported on the flange of the looper and thus is directly supported by the latter; and the looper has two rotations to one reciprocation of the needle and the take-up of the machine, and to one feed of the feeding mechanism. The ratio of movement just noted is for the purpose of more rapidly passing the loop of needle-thread around the mass of under thread, so that the other parts of the stitch-forming mechanism may have plenty of time in which to perform their operations and secure their functions after the looper has taken the needle-loop and cast it about the bobbin; and the rapid movement of the looper enables the latter to take the loop quickly from the needle, cast it rapidly about the bobbin, and be out of the way of the thread so that the take-up may perform its functions without interference. One operation of the looper is obviously idle, in so far as the engagement of the looper with the needle-thread is concerned. The locking-thread is led from the bobbin through the needle-hole in the throat-plate or cover-plate 50. Said needle-hole is formed in a depending boss or lug 51, on the underside of the throat-plate,—see Fig. 3,—said boss standing outside the periphery of the looper and at a point between the upper flange or edge of the bobbin and the path of the point of the looper.

The needle descends, as shown in Figs. 1 and 3, outside the body of the looper, throws out its loop toward the looper and the beak 17, of the latter enters the loop, carries it at once into engagement with the secondary hook, which enters the groove in the hook of the looper at or near the point, and by reason of its position and the inclined edge of the hook of the looper, the loop rapidly descends to the base of the secondary hook and below the plane of the bobbin. It may be noted at this point, that the rapid manipulation of the loop just described, causing it to quickly reach the base of the secondary-hook, is one of the elements which helps to reduce the quantity of needle-thread necessary to pass about the bobbin of any given size. It is to be further noted that though, in actual operation, the inner strand of needle-thread loop descends to the bottom of the secondary hook and that the inclination of the latter is such as to compel this action, it is not essential that the loop should be actually so manipulated by the two hooks; for, it is only necessary, as already stated, that the loop, or inner strand thereof, be caused to traverse the secondary hook to a position on its base which will insure its being below the plane of the bottom of the bobbin, which latter can be supported at any desired distance from the bottom of the looper to provide the necessary clearance for the passage of the strand of needle-thread.

By reason of the construction just de-

scribed, the inner strand of the loop commences to swing under the bobbin 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 thread passed about the bobbin, and also affords a reason for the absence of any side drag of consequence on the needle-loop. The continued movement of the looper causes the inner strand of the loop to pass beneath the bobbin, while the outer strand is carried on the periphery of the looper and over the top of the bobbin. When the looper has described substantially a half rotation the take-up begins to operate and draw in the loop to set the stitch.

It will be noted that the secondary hook holds the inner strand of the loop below the bobbin and takes any strain that may be upon the loop, and the looper holds the outer strand above the bobbin. Hence, no strain or pull upon the loop, in passing it about the bobbin, or in drawing it in to set the stitch, will cause the bobbin to be disturbed, and said loop will be held, by the secondary hook, until drawn in by the take-up for the purpose of setting the stitch.

It may be observed that the looper and bobbin 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 can be well secured by disposing the said parts otherwise. But, the disposition shown and described has functions and advantages which are herein set forth and, therefore, upon the same I desire to lay stress as an important feature of my invention. This disposition of parts and described construction provide a compact structure and produce a looper that can carry a very large bobbin or cop of thread, and one very much larger than those used in other machines of similar character, and this without increasing the size of the looper or the quantity of needle-thread used in the loop passed about the bobbin. That is to say, by eliminating the bobbin-case, as a holder or support for the bobbin, a larger bobbin can be employed and the looper can carry a greater quantity or mass of locking thread without increasing the size of the needle-loop; and, should the size of the looper be increased, its thread holding capacity would be proportionately increased, but the size of the needle-loop, necessary to pass about the bobbin, would not be proportionately increased. It should 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. At this point also I desire to lay stress upon the elimination of the bobbin-case, this being a feature of exceeding advantage, as already pointed out, and in point of the absence of wear upon the looper, and



by reason of the resultant reduction in the size of the loop carried about the mass of under thread; also because a much larger bobbin or mass of thread can be contained in the looper; also because of a reduction in cost of manufacture; and freedom from friction on the needle-loop. The presence of the independent, stationary secondary-hook also renders a very large bobbin permissible.

10 It may be noted that, in the operation of the machine, the bobbin is unwound in a direction opposite to that of the rotation of the looper, the bobbin thus having a tendency to wind up its thread and prevent slack forming at any point.

15 In the form of my invention, illustrated in Fig. 7, the looper-body 16, is substantially the same in form and structure as the form of looper first described. The disk 33, however, to which the looper body is secured by means of screws 34, is connected directly to the hub or body of the bevel-gear 35, by means of the screws 36, and said gear is secured by means of screw 37, to a hollow spindle 38, provided with the bearing head or flange 39, resting upon the arm 5, of the bracket 5<sup>x</sup>. The disk 29, carrying the secondary-hook 30, has its spindle 27, passing through the spindle 38, and secured in the arm 5, in the same manner as described above in connection with the first form of my invention. Meshing with the bevel-gear 35, is a bevel-gear 40, secured to shaft 1, by means of a screw 41, passing through an elongated hub 42, of said gear. The gear 40, is provided with rearwardly extending flange 43, parallel with the hub 42, providing between the two a circular chamber or space for the reception of packing 44, affording a suitable absorbent for oil or other lubricant. The chamber is closed by a circular plate 45, properly held in place by screws 46. Leading from the chamber which contains the packing 44, are apertures or ducts 47, extending to the base of the gear-teeth. A screw-cap 48, closes an aperture in the periphery of the gear 40, through which the lubricant may be introduced to the absorbent material.

50 The operation of the looper mechanism, of this second form of my invention, is identical in all respects with the first form above described, and in the rapid rotation of the driving gears the lubricant contained in the chamber of the bevel-gear 40, will be caused, by centrifugal action, to pass through the apertures 47, and lubricate the gears. This provides an automatic lubricating device for the gears tending to quiet and easy running thereof and reduction of wear.

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

1. In a sewing machine, a stitch-forming mechanism comprising a looper, a second

70 looper provided with a beak that is located within the circumference of said first looper, said loopers mounted independently of each other, and means for moving circularly one of said loopers relative to the other.

2. In a sewing machine, a looper, a second looper, said loopers mounted independently of each other, mechanism for revolving the first looper about an axis, a groove formed in said first looper concentric with said axis, and the second looper having its beak extending into said groove.

3. A looper mechanism comprising a looper adapted to move about an axis, a second looper having a spindle that extends through the center of said primary looper, a part attached to the end of said spindle by means of which the spindle and secondary hook are supported, and means intermediate said part and the primary hook by means of which said primary hook may be operated.

4. A looper mechanism comprising a circular looper provided with a channel in its wall extending to the point thereof and the width or depth of which channel extends parallel with the axis of the looper, a bobbin supported directly by the looper, and a stationary hook which operates in said channel and engages the inner strand of a loop and aids in passing the latter about said bobbin.

5. A looper mechanism comprising a looper having a concentric groove in the wall thereof, a bobbin supported directly by the looper, a stationary secondary-hook coöperating with the looper and operating within the groove and means for causing said parts to coöperate in passing a loop about the bobbin.

6. A looper 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 supported directly by the looper, a stationary, secondary-hook operating within said groove, and means for causing said parts to coöperate in passing a loop about the bobbin.

7. A looper mechanism comprising a looper provided with a loop-taking hook, a bobbin supported directly by said looper, a stationary, secondary-hook located and operating in the path of the loop-taking hook, and means on the loop-taking hook for causing the latter to carry a loop into contact with the secondary-hook and depress said loop to the base of the secondary-hook.

8. A looper mechanism comprising a looper having a loop-taking hook and a concentric channel, the depth or width of which extends substantially parallel with the axis of the looper, and the wall of said channel being flared at the bottom, and a stationary secondary-hook coöperating with the looper for passing a loop of thread about the bobbin.

9. A looper mechanism comprising a looper



having a loop-taking hook and two walls with a groove between them, the inner wall being shorter than the outer wall and provided with means for supporting a bobbin directly thereon, and a secondary-hook coöperating with the looper for passing a loop of thread about the bobbin.

10. A looper mechanism comprising a looper consisting of two parts detachably connected, a secondary-hook located between the two parts and having a stem extending through one of them, and means for engaging the stem for holding the secondary hook stationary.

11. A looper mechanism comprising a looper having a loop-taking hook; said looper also having a groove in its wall and the latter being inclined relatively to the looper-body and carrying a bobbin-support; and a secondary-hook coöperating with the loop-taking hook for passing a loop of thread about a bobbin, said secondary-hook operating within said groove of the looper.

12. A looper mechanism, comprising a circular looper in two parts, one of said parts carrying the loop-taking hook and the other of said parts having an externally screw-threaded spindle; a gear provided with an elongated tubular hub internally screw-threaded, whereby the hub may be detachably connected to said spindle; and means for actuating the looper.

13. A looper mechanism comprising a looper in two parts, one of said parts carrying a loop-taking hook; a driving gear; and screw-threaded telescoping means detachably connecting the driving gear and the other of the said parts of the looper.

14. A looper mechanism comprising a rotary looper, means for actuating the same including intermeshing bevel gears, one of said gears being provided with a chamber for containing a lubricant, and ducts extending from the chamber to the teeth, whereby in the operation of the gear the teeth thereof will be automatically lubricated.

15. A looper mechanism comprising a rotary looper, and means for actuating the same including intermeshing bevel gears, one of the latter being provided with a chamber

for containing a lubricant, means between the chamber and the gear-teeth for conducting the lubricant to the latter, and means whereby the lubricant may be introduced to the chamber.

16. A looper mechanism comprising a bracket, an arm carried by the bracket, a spindle supported by said arm, a gear surrounding the spindle, a looper connected to the gear, a secondary hook connected to the spindle and coöperating with the looper, and means for actuating the looper.

17. A looper mechanism comprising a looper operating in a horizontal plane, a bobbin supported directly by the looper and in a horizontal plane, a guide having a thread guiding portion below the top of the bobbin so that the bobbin thread runs directly from the bobbin to said guide, thereby preventing the bobbin thread from tilting the bobbin as the thread is drawn from said bobbin.

18. A looper mechanism for sewing machines comprising a primary hook and a secondary hook, and means for adjusting said hooks circularly relatively to each other.

19. A looper mechanism for sewing machines comprising a primary hook and a secondary hook, the latter being located within the former and means whereby the relative position of the two hooks may be regulated.

20. A looper mechanism for sewing machines comprising a primary hook and a secondary hook, and means for adjusting said hooks relatively in two directions substantially at a right-angle to each other.

21. A looper mechanism comprising a rotary looper, means for actuating said looper including intermeshing gears, one of said gears being provided with a chamber for containing a lubricant, and ducts extending from the chamber to the teeth of the gears by means of which said teeth are automatically lubricated.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM N. PARKES.

Witnesses:

CHAS. McC. CHAPMAN,  
M. B. HOARE.