No. 875,627. PATENTED DEC. 31, 1907.

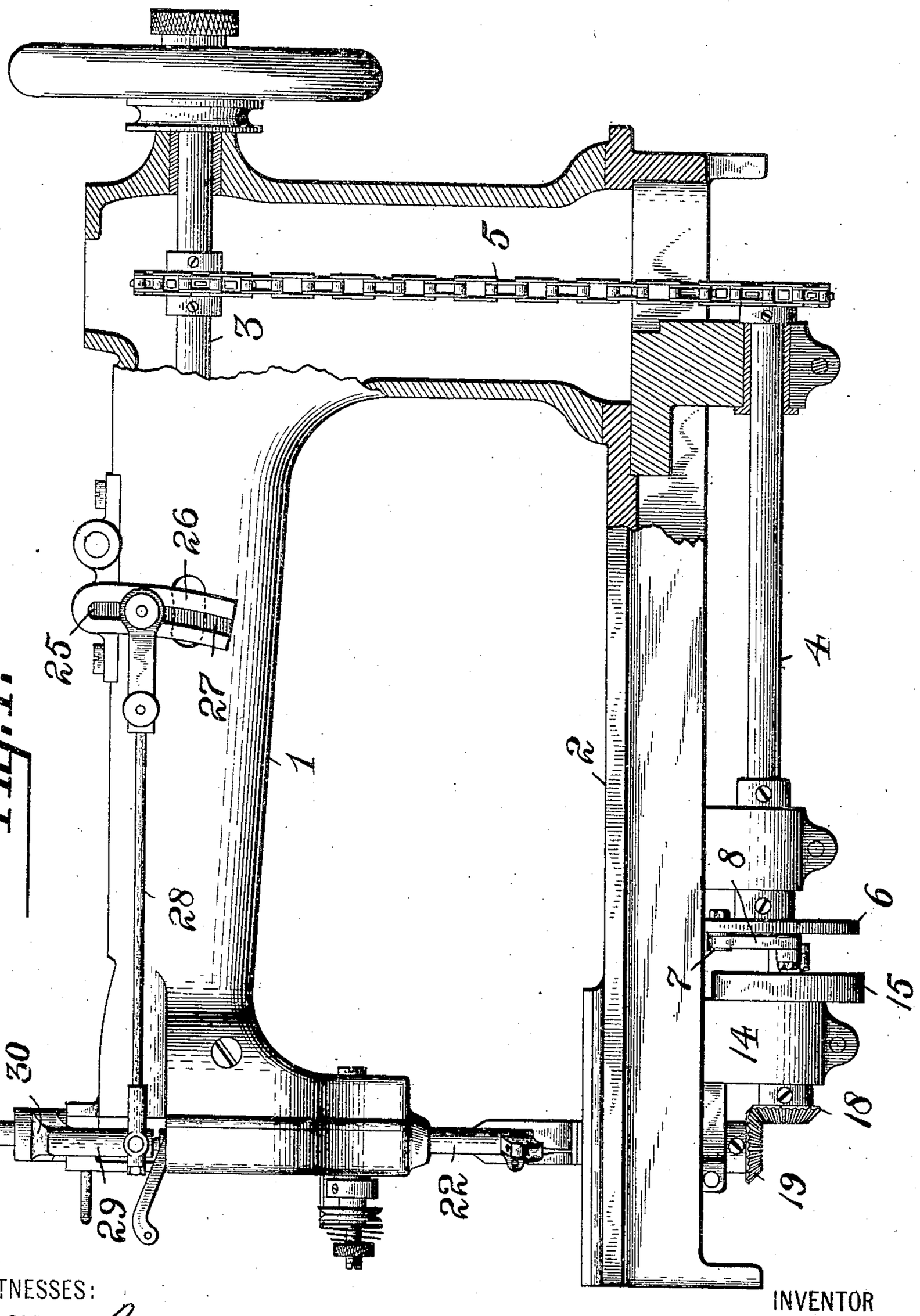
W. N. PARKES.

LOOPER MOVEMENT FOR SEWING MACHINES.

APPLICATION FILED JUNE 15, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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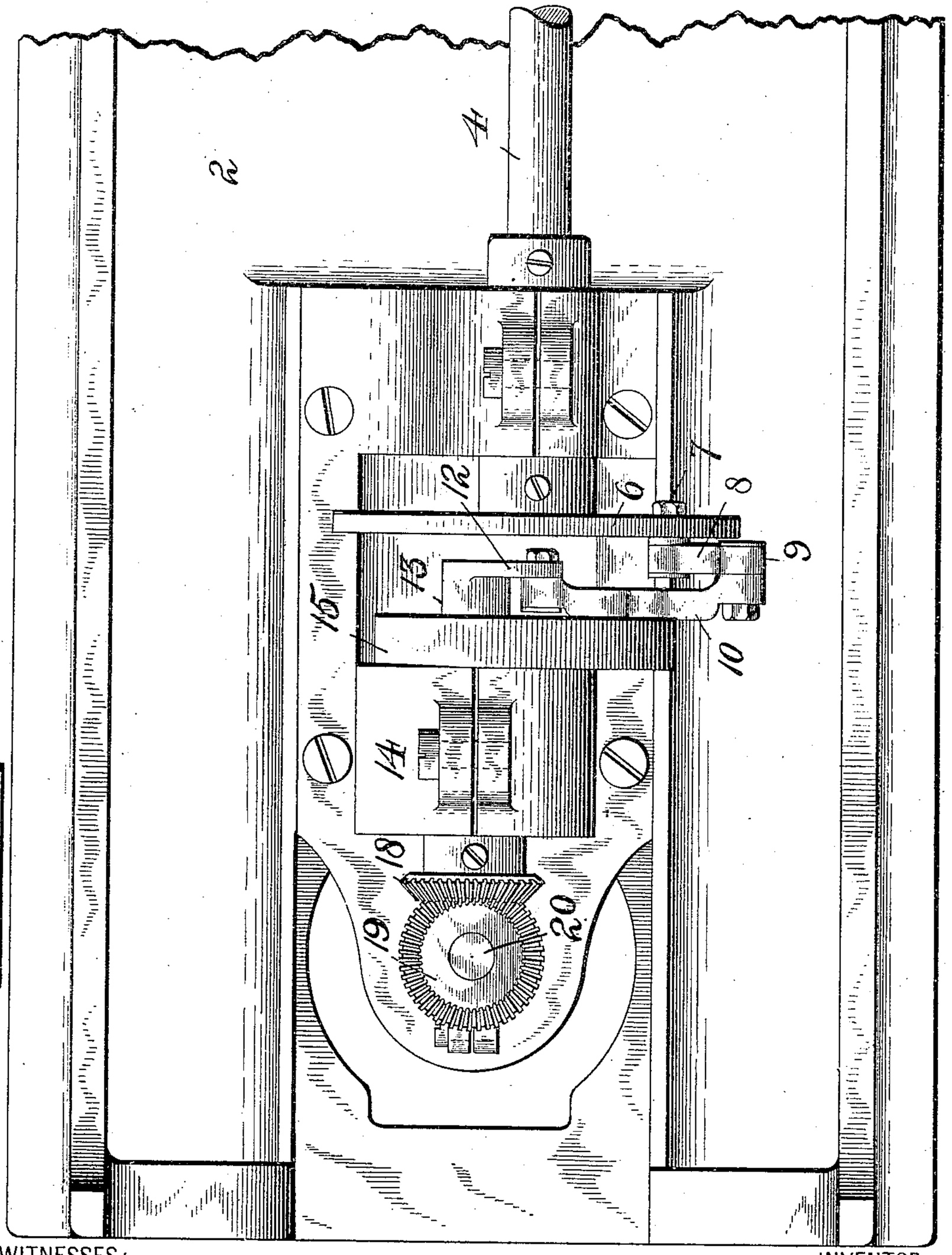
Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

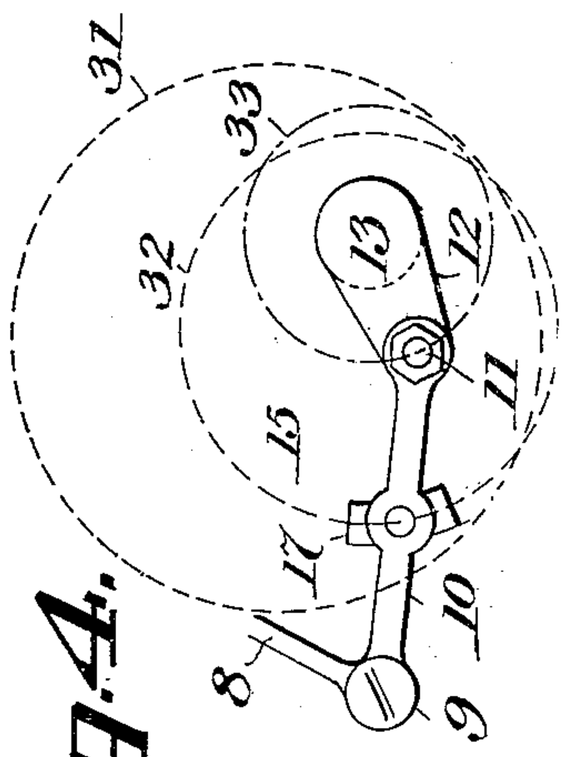

Fig. 3.

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LOOPER-MOVEMENT FOR SEWING-MACHINES.

No. 875,627. Specification of Letters Patent. Patented Dec. 31, 1907.

Application filed June 15, 1906. Serial No. 321,815.

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-Movements for Sewing-Machines, of which the following is a description.

This invention relates to sewing machines, and particularly to the driving mechanism of the hook or looper of the same.

The main object of the invention is to provide means for moving the hook very rapidly during loop engagement so the take up may have more time to perform the function of drawing up the loop and setting the stitch.

In rotary hook sewing machines in which a stitch is commenced and completed at each stroke of the needle, as for example in the commercial lock stitch machines now on the market, it is necessary to give the hook an accelerated movement during loop engagement so as to cause it to reach the position of loop discharge quickly, and thereby give the take up time to perform its function of drawing up the loop and setting the stitch before the needle reaches the material to commence a succeeding stitch. This is accomplished by giving the hook what is known as a differential movement or by giving it a plurality movement. Under the differential movement the speed of the hook is accelerated during loop engagement and it is given only a single rotation to each reciprocation of the needle, while under the plurality movement the hook is revolved at a uniform speed two or more times to each reciprocation of the needle, the hook having therefore one or more idle rotations to each stitch. The plurality movement is defective in that there is a waste of power in giving the hook idle movements, more wear on the part because of the same, and objectionable parts, such as gearing etc., are required in producing this movement. And the differential movement is defective because the accelerated speed of the hook does not continue during a sufficient extent of the rotation of the hook, making it therefore necessary to eliminate more of the bearing between the hook and the bobbin case, or to retard to a very objectionable extent the action of the take-up relative to the movement of the hook.

Under my improved movement, the accelerated speed of the hook is maintained until, the position of loop discharge between the hook and the bobbin as in the plurality movement is reached. In other words, the advantage of the plurality movement in connection with loop discharge is secured without giving the hook idle movements.

Referring now to the drawings: Figure 1 is a side view of a machine, in which my invention is incorporated, parts being in section to show details of the construction. Fig. 2 is a bottom plan view of the part of the machine to which my invention is applied, and Fig. 3 is a sectional view of the same; the location of the hook relative to the driving mechanism and the needle, being disclosed in this view. Fig. 4 is a diagrammatic view showing the movement of my device.

In the drawings, 1 represents the arm of the machine, 2 the base, and 3 the upper or driving shaft.

In suitable bearings in the bed of the machine, is journaled a shaft 4 disposed to revolve in a vertical plane, and which is revolved by a chain connection 5 intermediate the same and the driving shaft 3. The sprocket wheels mounted on the shafts 3 and 4 which the chain engages, are of such size that the shaft 4 is rotated in unison with the shaft 3. To the forward end of the shaft 4 is secured a disk 6, which carries a crank pin 7, and on the said crank pin, is journaled one end of a link 8. The other end of said link 8 is pivoted at 9 (Fig. 4) to the outer end of a small lever 10. The other end of the said lever 10 is journaled at 11 to an arm 12, which latter is secured to a shaft 13 disposed to revolve in the same plane as the shaft 4 and journaled in a suitable bearing 14 carried by the bed of the machine. The shaft 13 is located eccentrically relative to the shaft 4 and these shafts 4 and 13 are adapted to revolve in the same plane as will be clearly understood by referring to Figs. 1 and 3. To the bearing 14 is secured in a suitable manner, a disk 15, in which is formed a groove or way 16, the latter being eccentric with respect to the axis of the shaft 13. On the short lever 10, is suitably pivoted a shoe 17, which slides in the groove 16 of the disk 15. This groove 16 runs concentric with the center of the disk 15, and therefore, eccentric relative to the axis of the shaft 13, as before stated. The location of shaft 13 relative to the shaft 4,

and the location of the groove 16 relative to the axes of the said shafts 13 and 4, and the location of the crank pin 7 relative to the arm 12 and the axes of the shafts 13 and 4, are such that the increase speed of the shaft 13 is substantially maintained during nearly a complete revolution of the shaft 13 as may be understood by referring to Fig. 4.

To the forward end of the shaft 13, is secured a beveled gear 18, which meshes with a beveled gear 19, carried by the lower end of a vertical shaft 20. The vertical shaft 20 is journaled in suitable bearings and adapted to revolve in a horizontal plane, as shown in Fig 3, and to the upper end of said shaft, is secured a hook 21. This hook mechanism is the same as that illustrated and described by me in my Patent No. 730,692, issued June 9, 1903, and also the same as in my co-pending application, Serial No. 93,037, filed Feb. 7, 1902.

In suitable bearings in the forward end of the arm of the machine, is suitably located to reciprocate, a needle-bar 22, and this bar is so mounted that it may be oscillated on its axis, as shown in my said co-pending application. To the lower end of said needle-bar, is secured a needle holder 23, which carries a needle 24, that is adapted to coöperate with the hook 21. The needle 24 is located eccentrically relative to the axis of the bar 22, and therefore, it is to be understood that when the bar is oscillated, the needle is moved laterally. The axis of the bar is concentric with the axis of the shaft 20, so it is to be understood that when the bar is oscillated, the needle is moved laterally about the axis of the hook 21, as described in my said co-pending application.

In a suitable bearing on the arm of the machine, is pivoted at 25 a segment lever 26, in which is formed a way 27, that extends over the pivot of the lever. In the way, is adjustably located one end of a connection 28, the other end of said connection being in engagement with an arm 29, extending downwardly from a lever 30, that is pivoted concentric with the axis of the needle-bar. The segment lever 26 is oscillated in a usual manner, and from its movement, the needle-bar 22 is oscillated, as shown and described in my said copending application, Serial No. 93,037, filed February 7, 1902.

The gears 18 and 19 are of equal size, and it is therefore to be understood that when the shaft 4 is rotated once, the hook 21 is rotated once. This gear connection is provided for the purpose of locating the hook to revolve in a horizontal plane, so that the needle may be vibrated laterally, if desired, but it is to be understood that this compound differential movement I produce on the hook, does not require any gear, that from it the hook may be driven in a vertical plane or otherwise.

The dotted line 31 in Fig. 4 indicates the path of the crank pin 7 which is carried by the disk 6, and the dotted line 32 the path of the pivot of the lever 10 or of the shoe on which said lever is pivoted and the dotted circle 33 the path of the pivot 11. It is to be noted that the path of the crank pin 7 is concentric with the axis of the shaft 4, but eccentric with respect to the shaft 13, that the path of the pivot of lever 10 is concentric with the center of the disk 15, but eccentric with respect to the axis of the shaft 13, that the path of the pivot 11 is concentric with the axis of the shaft 13, but eccentric with respect to the path of the crank pin 7. And the axis of the shaft 13 is eccentric with respect to the axis of the shaft 4.

The operation of this device will be understood by referring to Fig. 4.

It is to be understood that I do not wish to be confined to the particular construction of my invention as herein illustrated and described, nor do I wish to be restricted to the use of this device in connection with continuous rotating parts. It is obvious for example that it can be used to transmit oscillatory movements. And of course by changing the eccentricity of the parts relative to each other the extent of the increase in speed of the hook relative to a complete rotation of the same may be increased or decreased. And the parts can be made adjustable so that the speed of the movements can be changed without changing the parts, but in practice I prefer to make them so as to give the required change in the movement without any adjustment.

While the hook in the machine illustrated is adapted to revolve in a horizontal plane it is of course understood that the device is adapted to rotate the hook in a vertical plane. And when so rotated no gearing nor sprocket wheels are necessary as is the case when the hook shaft is revolved a plurality of times to each revolution of the driving shaft as under the plurality movement.

Having thus described my invention, what I claim as new is:—

1. In a sewing machine, a revolving looper, means for operating the same comprising a revolving shaft, a second shaft, a member having a groove extending around the axis of said second shaft, a lever having a fulcrum sliding in said groove, a connection between one end of said lever and said first shaft, a connection between the other end of said lever and said second shaft, and means whereby the aforesaid looper is operated from the movement of said second shaft.

2. In a sewing machine, a looper adapted to be revolved, means for revolving the same comprising a revolving shaft, a second revolving shaft, a lever connection between said shafts, means for guiding the fulcrum of said lever in a path around one of the shafts

and eccentric thereto, and means whereby the aforesaid looper is operated from the movement of one of said shafts.

3. A sewing machine comprising two shafts located eccentrically relative to each other, a lever connection between said shafts, and means for guiding the fulcrum of said lever around one of the shafts and eccentric thereto, a looper mechanism comprising a looper, and means whereby said looper is revolved from the movement of one of said shafts.

4. A sewing machine comprising two shafts located eccentrically relative to each other, a lever, a connection between one end of said lever and one of said shafts, a connection between the other end of said lever and the other of said shafts, means for guiding the fulcrum of said lever around one of said shafts, a looper suitably mounted, and means whereby said looper is operated from the movement of one of said shafts.

5. A sewing machine comprising two shafts located eccentrically to each other and the axes of which are parallel, a part that is guided around the axis of one of said shafts and eccentric thereto, a connection between said part and one of said shafts, a connection between said part and the other of said shafts, a looper suitably mounted, and means whereby said looper is operated from the movement of one of said shafts.

6. In a sewing machine, a revolving shaft, a crank pin or its equivalent carried by said shaft, a link having one end pivoted on said crank pin, a second revolving shaft, a part guided around the axis of said second shaft and eccentric thereto, a connection between said part and the other end of the aforesaid link, a crank pin or its equivalent carried by said second shaft, a connection between said crank pin and said guided part, a looper, and means whereby the same is revolved from the movement of said second shaft.

7. A sewing machine comprising a revolving shaft, a second shaft, a member having a groove extending around the axis of said second shaft, a lever having a fulcrum sliding in said groove, a connection between one end of said lever and said first shaft, and a connection between the other end of said lever and said second shaft, a looper, and means adapting said second shaft to revolve said looper.

8. A sewing machine comprising a revolving shaft, a second shaft that revolves in the same plane as said first shaft, said second shaft located eccentrically to said first shaft, a lever connection between said shafts, means for guiding the fulcrum of said lever around the second shaft and eccentric thereto, a looper, and means adapting said second shaft to revolve said looper.

9. A sewing machine comprising a looper that is adapted to revolve in a horizontal plane, a shaft that revolves in a vertical plane from the movements of which said looper is revolved a second shaft that also revolves in a vertical plane, said second shaft located eccentrically to said first shaft, a lever connection between said shafts, means for guiding the fulcrum of said lever around one of said shafts and eccentric thereto, a looper, and means adapting said second shaft to revolve said looper.

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

WILLIAM N. PARKES.

Witnesses:

J. B. McGirr,

W. J. Keating.