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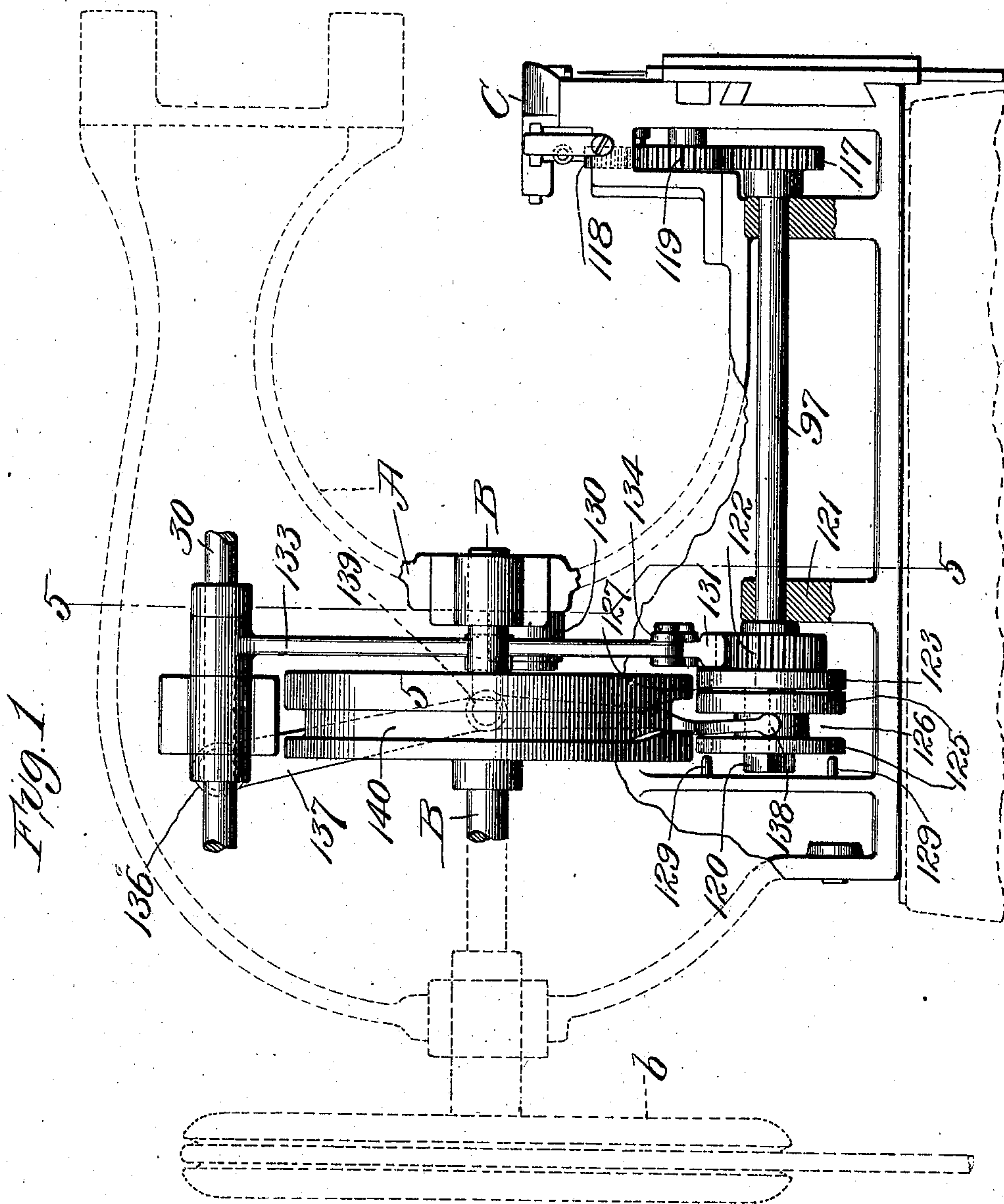
PATENTED MAR. 13, 1906.

G. L. CORCORAN & G. A. DOBYNE.

SHUTTLE ACTUATING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED FEB. 20, 1903.

4 SHEETS—SHEET 1.



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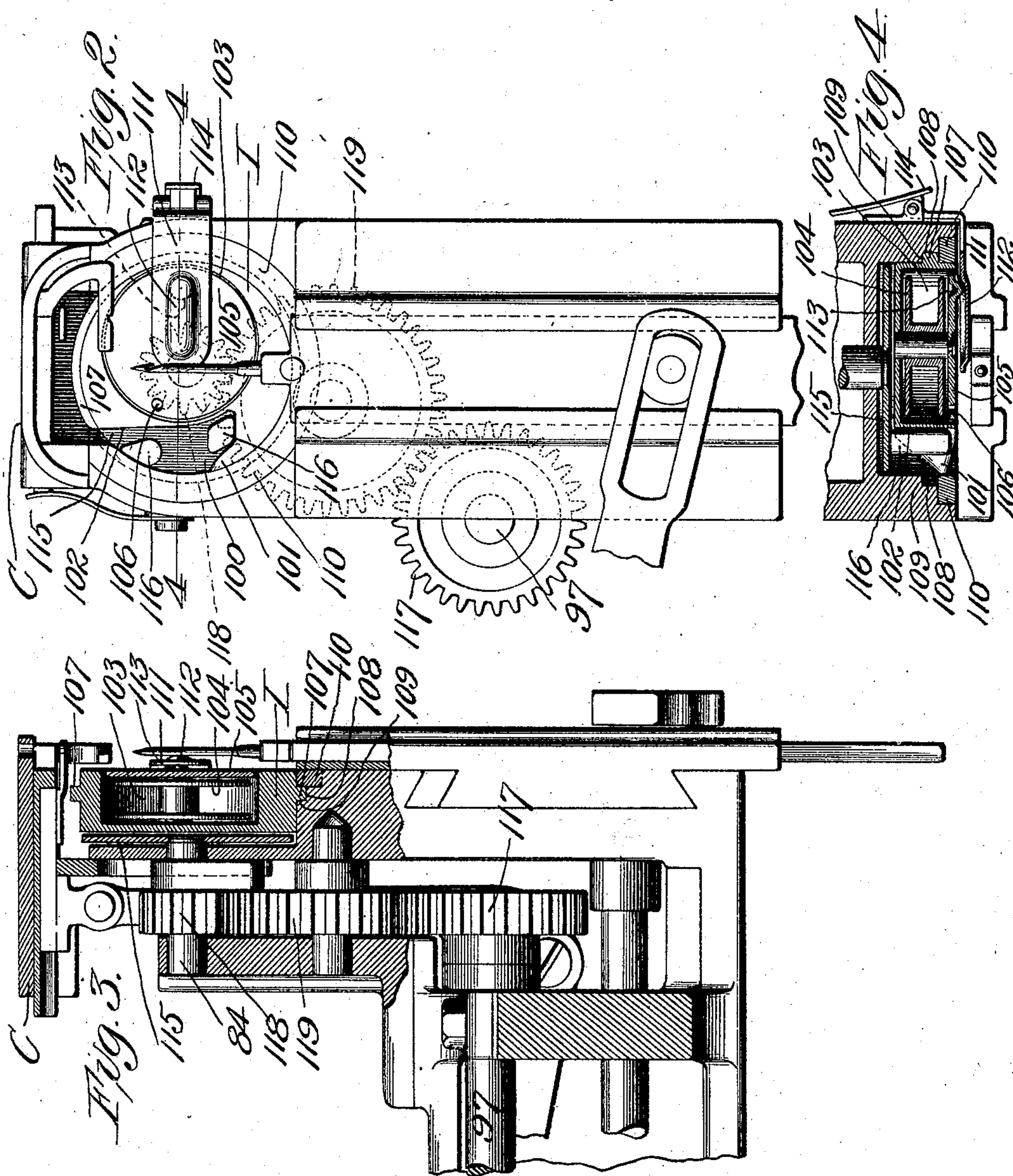
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4 SHEETS—SHEET 2.



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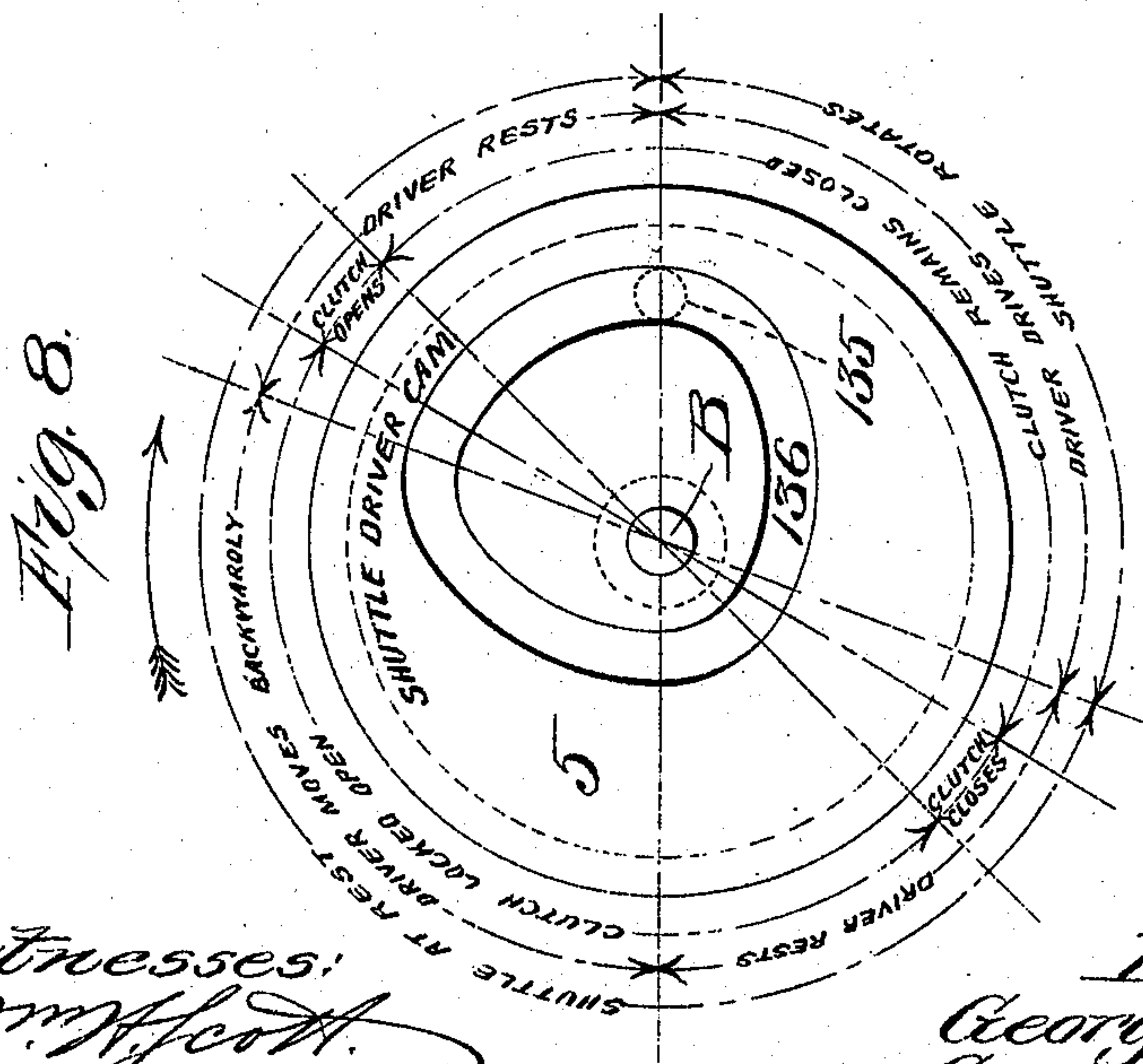
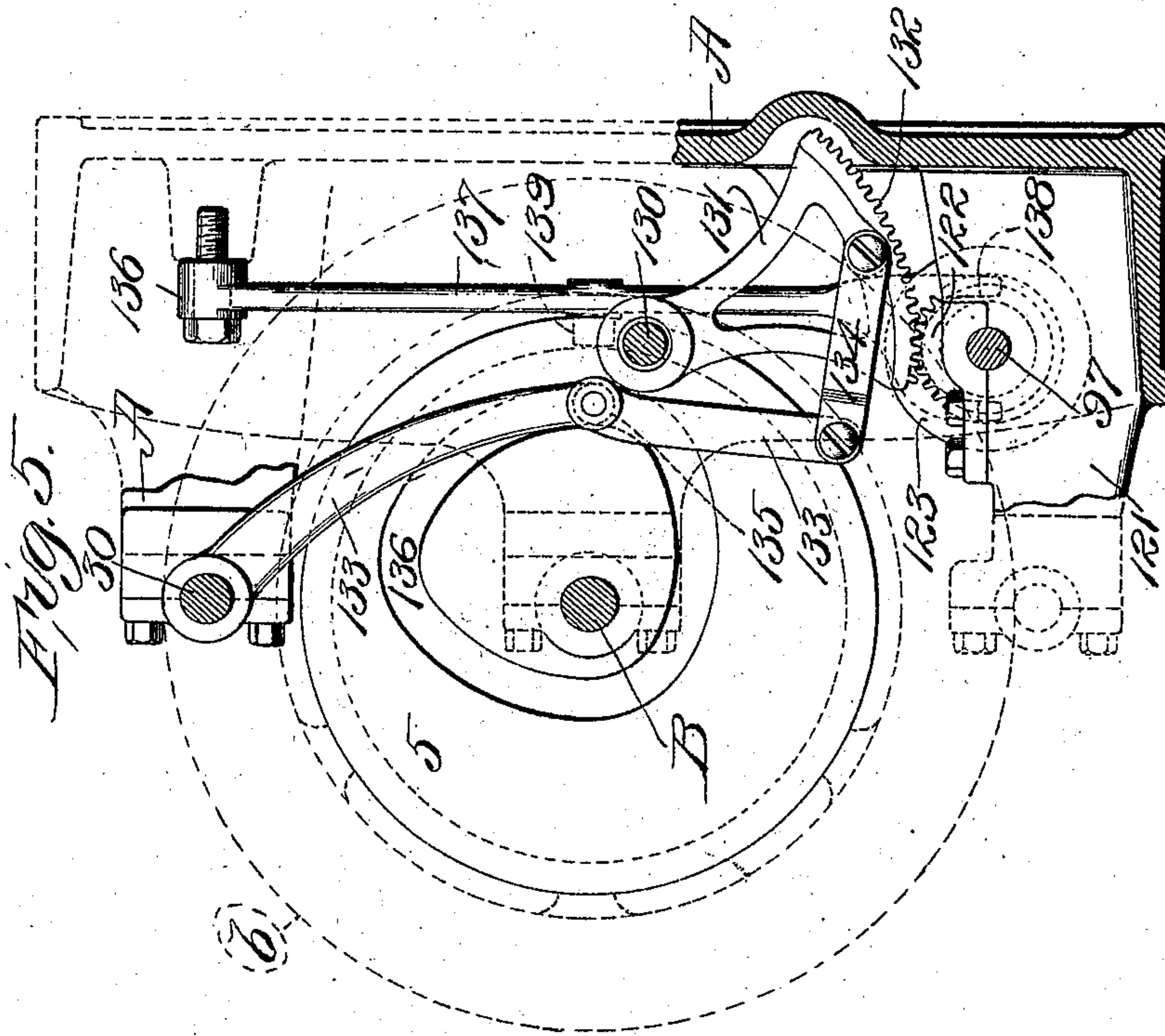
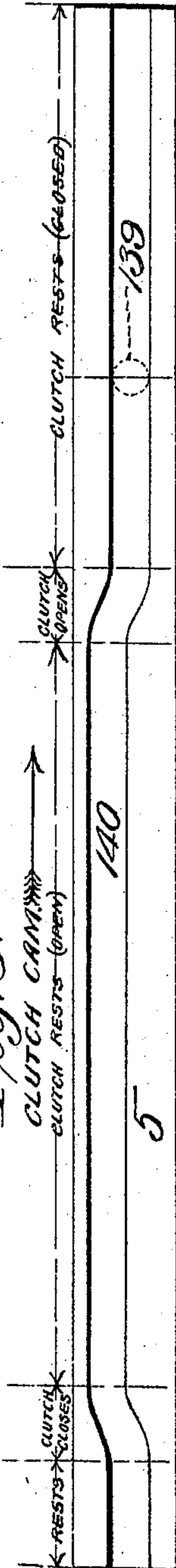


Fig. 9.



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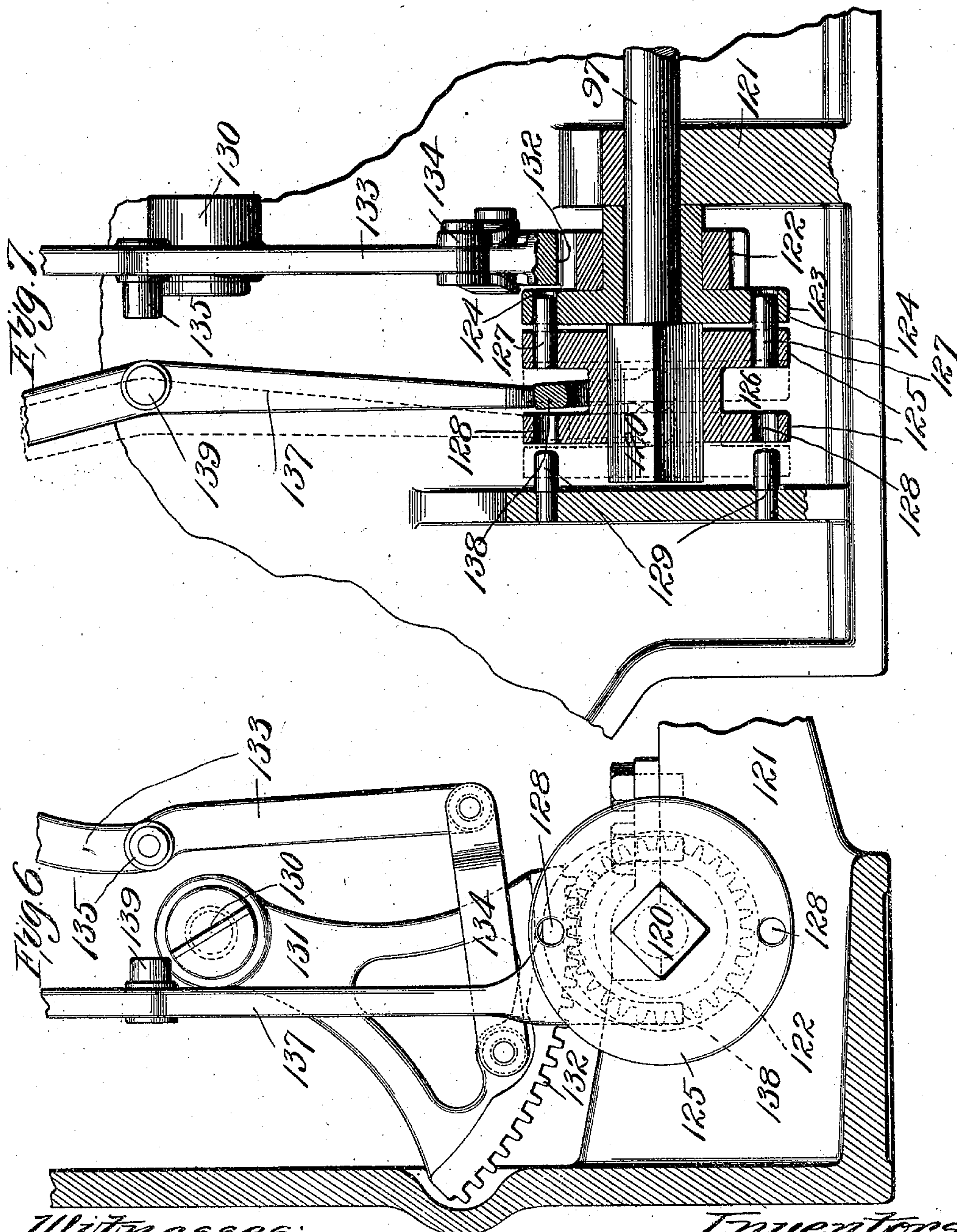
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

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ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO CHAMPION SHOE  
MACHINERY COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF  
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## SHUTTLE-ACTUATING MECHANISM FOR SEWING-MACHINES.

No. 815,069.

Specification of Letters Patent.

Patented March 13, 1906.

Application filed February 20, 1903. Serial No. 144,318.

*To all whom it may concern:*

Be it known that we, GEORGE L. CORCORAN and GEORGE A. DOBYNE, citizens of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Shuttle-Actuating Mechanism, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a sewing-machine with the present invention applied. Fig. 2 is a front elevation of the portion of the machine which supports the shuttle. Fig. 3 is a detail transverse sectional elevation through about the vertical center of the shuttle. Fig. 4 is a horizontal sectional elevation on about the line 4 4 of Fig. 2. Fig. 5 is an elevation on about the line 5 5 of Fig. 1 looking from the right of said figure. Fig. 6 is a detail view showing the rear end of the main shuttle-driving shaft and the segmental-gear or shuttle-driver which coöperates with a gear upon said shaft. Fig. 7 is a vertical sectional elevation of the parts shown in Fig. 6. Fig. 8 is a diagrammatic view illustrating, primarily, the cam which actuates the shuttle-driver, this view also showing the relative movements of the clutch and of the shuttle; and Fig. 9 is a view showing the clutch-cam developed.

Our invention relates to improvements in shuttle-actuating mechanism, the invention being particularly adapted to use in sewing-machines.

Among our objects is to provide mechanism whereby a rotatable shuttle can be intermittently rotated, the shuttle remaining at rest for a length of time necessary to permit certain operations of the machine embodying the shuttle, then being rotated in order to cause its point to engage the loop of the thread and to carry such loop about the bobbin-thread in a well-understood manner and being then brought to rest in order to permit the proper devices of the machine to slowly take up the loop.

To these ends and also to improve generally upon mechanism of the character indi-

cated our invention consists in the various matters hereinafter described and claimed.

Referring now more particularly to the drawings, A indicates the supporting-standard of the machine, here shown as a sewing-machine, and B is the driving-shaft, which receives its power from any suitable source, such shaft being here shown as provided with a driving-pulley b.

C is the work-table, below which the shuttle is supported in the organization illustrated, and 30 is a rock-shaft which transmits motion to certain elements of the organized machine, this shaft having bearing upon the present matter only in that it serves as a support for one of the levers or arms employed in the shuttle mechanism. The main shaft B carries a cam disk or block 5. The before-mentioned shaft 30 extends horizontally and in a plane at substantially right angles to the plane including the shuttle, and the shuttle-driving shaft 97 is suitably supported upon the machine-standard and lies substantially parallel with the before-mentioned shaft 30, the main shaft B being parallel to the shafts 30 and 97 and lying intermediate said shafts.

The shuttle I comprises a generally circular member having a cut-away portion 100, by means of which the point 101 is produced and there is also produced the wall or surface 102, adapted to be engaged by the hereinafter-mentioned driving-lugs. The shuttle is recessed, as shown at 103, for the purpose of receiving the bobbin 104, a plate 105 holding the bobbin in place in any suitable manner and being provided with an opening 106 for the passage of the bobbin-thread. The periphery of the shuttle is provided with a rib 107, adapted to operate in a groove 108, said groove being concentric with the shuttle and being conveniently produced by forming a shoulder 109 in the shuttle-supporting member and securing a guard-plate 110 to said supporting member in such manner that the groove 108 is formed between the said shoulder and the said guard member, the rib 107 lying between the said elements. Pivotaly supported upon the standard is a plate 111, which is adapted to be thrown across a portion of the face of the plate 105, this locking-plate 111 being provided with a depression



112, in which is received an eccentric projection 113 upon the plate 105. Thus the bobbin is prevented from rotating with the shuttle. The locking - plate 111 is preferably  
 5 yieldingly held in closed position, as by means of a spring 114.

Secured to a shaft 84, concentric with the shuttle, is a driving-plate 115, upon whose outer surfaces are the before-mentioned driving-lugs 116, these lugs being adapted in the  
 10 rotation of the driving-plate to engage the before-mentioned wall or surface 102 of the shuttle, and thus carry the shuttle with said driving-plate. The hereinbefore-mentioned  
 15 rotatable shaft 97 is provided with a gear 117, and this gear is in driving connection with the gear 118 upon the shaft 84, such connection being conveniently effected through the intermediate gear 119. Therefore the rota-  
 20 tion of the shuttle is controlled by the rotation of the driving-shaft 97, and as one of the driving-lugs 116 lies between the before-mentioned shuttle-wall 102 and the shuttle-point 101 said lug serves to prevent undesired move-  
 25 ment of the shuttle after the driving-plate 115 has come to rest. There is sufficient space between the locking-plate 111 and the face of the shuttle and the face of the recess-closing plate 105 to permit the passage of the  
 30 loop, and there is sufficient space between the driving-lugs 116 and the shuttle to permit the withdrawal of the loop by the take-up.

In order to cause the shuttle to be intermittently rotated, said shuttle being carried  
 35 through a portion of a revolution in order to enter the loop, continuing through the revolution to carry the loop about the bobbin-thread, and then coming to rest in order to permit the loop-thread to be slowly drawn  
 40 taut, the driving-shaft 97 is intermittently rotated in the manner to be now described. The driving-shaft 97 is provided with a non-circular portion 120, and loosely mounted upon the said shaft, as between one end of  
 45 said non-circular portion and a suitable standard 121, is a gear 122, provided with a plate 123, having pin-receiving openings 124. Slidable upon said non-circular portion 120 is a clutch-sleeve 125, which has a peripheral re-  
 50 cess 126 and is provided upon one side with pins 127, adapted to enter the before-mentioned openings 124 in the loose driving-gear, the other face of the said clutch-sleeve being provided with openings 128, adapted to re-  
 55 ceive pins 129, projecting from any relatively fixed portion of the machine. Preferably openings are bored entirely through the clutch-sleeve in both of the flanges upon the sides of the before-mentioned peripheral re-  
 60 cess 126, said openings being in line with each other, whereby they can be readily produced, and the pins 127 are driven or otherwise secured in the openings upon the desired side of the clutch-sleeve. It is to be noted that the  
 65 pins 127 and 129 are of such length that the

clutch-sleeve is always in engagement with either the pins upon the relatively fixed support or the said driving-gear, the pins 129, for example, entering the openings 128 before the  
 70 pins 127 leave the openings 124. Thus as the pins 129 are in fixed positions and by reason of the mechanism hereinafter described the driving-gear 122 always comes to rest in a given position the clutch - sleeve when  
 75 about to be shifted is always guided into the desired new position.

Suitably pivoted, as upon the stud 130, is a rocking plate 131, provided with a segmental gear 132, and pivoted upon the before-men-  
 80 tioned rock-shaft 30 is a lever 133, which is preferably connected to the said rocking plate by means of a link 134, said lever being provided with a cam-roll 135, which enters the cam-groove 136 in one face of the cam  
 85 block or disk 5, this cam-groove being shown most clearly in Figs. 5 and 8.

Suitably pivoted, as upon the stud 136, is a lever 137, whose lower free end is provided with a yoke 138, the arms of said yoke being  
 90 received in the before-mentioned peripheral groove 126 in the clutch-sleeve 125. Said lever 137 is provided with a cam-roll 139, which enters a cam-groove 140 in the periphery of the cam-disk 5, the said cam-groove being shown developed in Fig. 9. The segmental  
 95 gear-plate 131 serves to impart rotary motion to the driving-gear 122, and the lever 137, with its yoke, of course controls the clutch-sleeve 125, by means of which said driving - gear 122 is operatively connected  
 100 with the shaft 97.

Referring now more particularly to Figs. 8 and 9, it will be seen that when the parts are in what we have termed their "normal" po-  
 105 sitions with the shuttle at rest, as shown in Fig. 2, rotation of the cam-disk 5 permits the segmental gear to remain at rest and also permits the clutch to remain at rest in the gear-engaging position shown in Fig. 7, the periph-  
 110 eral cam shown in Fig. 9 then causing the clutch to be thrown into unlocking position, although it and the shaft 97 are held against rotation by reason of the engagement of the clutch-sleeve by the stationary pins 129. After the clutch has been thrown into such  
 115 open position it rests in said position, while the segmental gear-operating cam causes said gear to be thrown backwardly in order to place the same in driving position, the gear 122 merely idly rotating upon the shaft 97 as  
 120 said segmental gear is thrown into its said backward or what may be termed "operative" position. After the segmental gear has reached the said position and while the same is at rest the clutch-sleeve is thrown into  
 125 closed position, engaging the driving-gear 122, thus locking said gear in driving connection with the said shaft 97, and soon after the clutch-sleeve has thus locked the driving-gear upon the said shaft the segmental gear-  
 130



operating cam causes said gear to be thrown forwardly, and thus causes rotation of the shaft 97.

From the time of the starting of the machine until this time at which the segmental driving-gear commences its forward movement the driving-shaft 97 has been at rest and has been locked in its position of rest by reason of the engagement of the clutch-sleeve with either the gear 122 when held against movement by the segmental driving-gear or the stationary pins 129. During about the last quarter of revolution of the cam-disk 5, however, and while the clutch-sleeve remains locked to the driving-gear 122 the shaft 97 is rotated. Consequently the shuttle is locked at rest from the time that the machine starts a cycle of revolutions until the segmental gear commences its forward or driving movement, the shuttle rotating during this period of driving movement of the segmental gear and moving through a complete revolution by reason of the proportions of the gears 117, 118, and 119, notwithstanding the fact that the shaft 97 may not be driven through a complete revolution.

We are aware that minor changes in the construction, arrangement, and combination of the several parts of our device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of our invention.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination with a shuttle and its complementary stitch-forming mechanism, of means for intermittently operating said shuttle and comprising a driving-shaft having driving connection therewith, a gear having movement independent of said shaft, a plate pivoted for rocking movement and cooperating with said gear, a cam, a pivotally-supported arm connected to said rocking plate and provided with a part cooperating with said cam, a clutch adapted to connect said gear and said shaft, and means for operating said clutch; substantially as described.

2. The combination with a shuttle and its complementary stitch-forming mechanism, of means for intermittently operating said shuttle and comprising a shaft in driving connection therewith, a gear having movement independent of said shaft, a plate pivoted for rocking movement and cooperating with said gear, a pivotally-supported arm connected to said rocking plate, a clutch adapted to connect said gear and said shaft, a second pivotally-supported arm adapted to throw said clutch, and a cam-disk provided with cams which respectively cooperate with said respective arms; substantially as described.

3. The combination with a shuttle and its complementary stitch-forming mechanism,

of means for intermittently operating said shuttle and comprising a gear having movement independent of said shuttle, an intermittently-movable driving member cooperating with said gear, means for locking said driving member against movement, a clutch adapted to connect said gear to said shuttle, means whereby said clutch is locked to said gear to hold the shuttle against movement during the time that the said driving member is locked against movement, means whereby said clutch is locked against shuttle-driving movement and out of engagement with said gear, to lock said shuttle against movement during the movement of said driving member other than shuttle-driving movement, and means whereby said clutch connects said gear and said shuttle and is free to receive shuttle-driving movement during the time that said driving member moves through its shuttle-driving movement; substantially as described.

4. The combination with a shuttle and its complementary stitch-forming mechanism, of means for intermittently operating said shuttle and comprising a driving-shaft having driving connection therewith, a gear having movement independent of the shaft, a plate pivoted for rocking movement and cooperating with said gear, a cam-disk having a plurality of cams, a pivotally-supported arm connected to said rocking plate and provided with a part cooperating with one of said cams, a clutch slidable on said shaft and adapted to connect said gear and means for operating said clutch, connecting with another of said cams.

5. The combination with a shuttle and its complementary stitch-forming mechanism, of means for intermittently operating said shuttle and comprising a driving-shaft having driving connection therewith, a gear having movement independent of said shaft, a plate pivoted for rocking movement and cooperating with said gear, a pivotally-supported arm having a pivotal connection with said rocking plate, a clutch adapted to connect said gear and said shaft, and cams operatively connected respectively with said pivotally-supported arm and said clutch.

6. The combination with a shuttle and its complementary stitch-forming mechanism, of means for intermittently operating said shuttle and comprising a driving-shaft having driving connection therewith, a gear having movement independent of said shaft, a rocking segment cooperating with said gear, means for reciprocating said segment including an arm pivotally supported at one end and having a link connection at its opposite end with said segment, and a cam operatively connected with said arm intermediate its ends, a clutch adapted to connect said gear and said shaft, and means for operating said clutch.



7. The combination with a shuttle and its complementary stitch-forming mechanism, of means for intermittently operating said shuttle and comprising a driving-shaft having driving connection therewith, a gear having movement independent of said shaft, a rocking plate cooperating with said gear, a rock-shaft, means for reciprocating said rocking plate including an arm pivotally supported at one end to said rock-shaft, a link connection at the opposite end thereof with said rocking plate, a cam-disk having a cam cooperating with said arm intermediate its ends, a clutch adapted to connect said gear and said shaft, an auxiliary cam on said disk, and an arm connecting respectively with said auxiliary cam and the clutch.

8. The combination with a shuttle and its complementary stitch-forming mechanism, of means for intermittently operating said shuttle and comprising a driving-shaft having driving connection therewith, a gear having movement independent of said shaft, means for imparting movement to said gear, the said gear having a plurality of apertures in one of its sides, a stationary support arranged opposite said gear having a plurality of pins projecting inwardly in line with said apertures, a clutch-sleeve slidably mounted upon said shaft said sleeve having in its opposite sides apertures and pins complementary to the aforementioned apertures and pins, and means for imparting movement to said sleeve to engage and disengage respectively the apertures in the gear and stationarily-supported

ed pins including a cam-actuated pivoted arm.

9. The combination with a shuttle and its complementary stitch-forming mechanism, of means for intermittently operating said shuttle and comprising a driving-shaft having driving connection therewith, a gear having movement independent of said shaft, means for imparting movement to said gear including a cam, a plate pivoted for rocking movement and cooperating therewith and a pivotally-supported arm connected to said rocking plate and provided with a part cooperating with said cam, the said gear having a plurality of apertures in one of its sides, a stationary support arranged opposite said gear having a plurality of pins projecting inwardly in line with said apertures, a clutch-sleeve slidably mounted upon said shaft said sleeve having in its opposite sides apertures and pins complementary to the aforementioned apertures and pins, and means for imparting movement to said sleeve to engage and disengage respectively the apertures in the gear and stationarily-supported pins, including a cam-actuated pivoted arm.

In testimony whereof we hereunto affix our signatures, in the presence of two witnesses, this 30th day of January, 1903.

GEORGE L. CORCORAN.  
GEORGE A. DOBYNE.

Witnesses:

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