C. A. DEARBORN.

FEED MECHANISM FOR SEWING MACHINES.

APPLICATION FILED FEB. 1, 1909.

991,705.

Patented May 9, 1911.

2 SHEETS—SHEET 1.

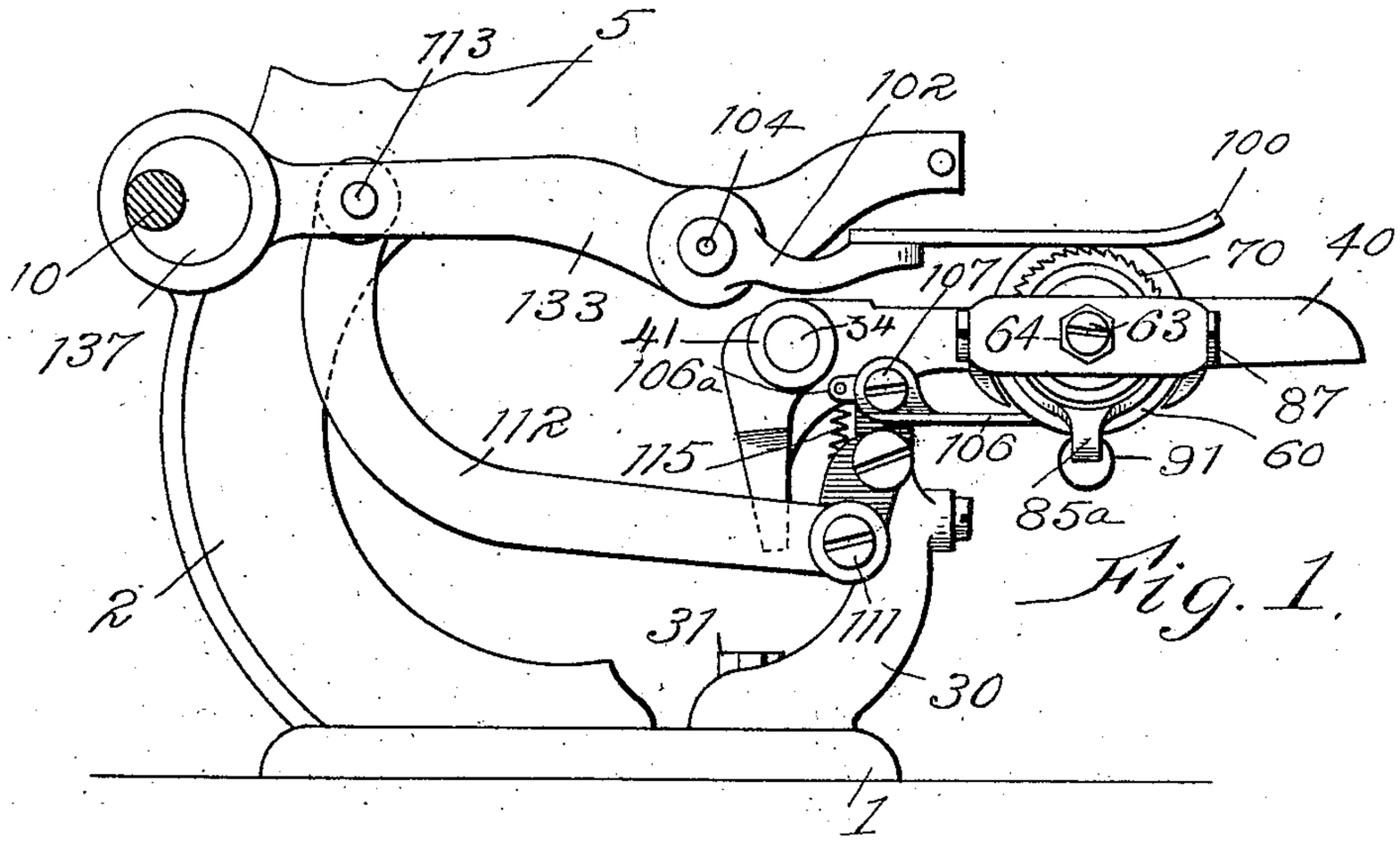

Fig. 1.

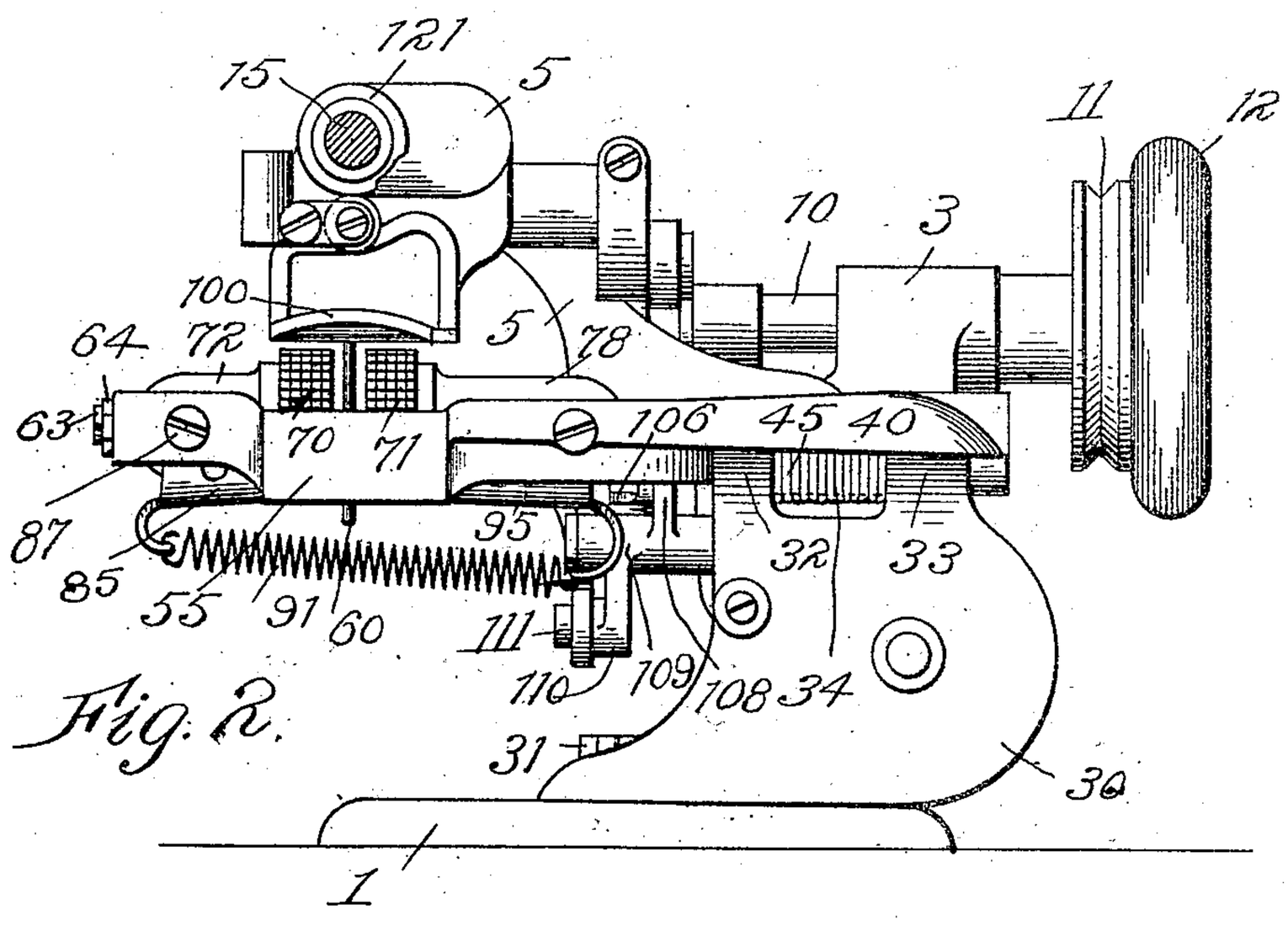

Fig. 2.

Witnesses:
Wm. A. Courtland
H. M. Knight.

Charles A. Dearborn
Inventor,
By his Attorneys Knight Bros

C. A. DEARBORN.

FEED MECHANISM FOR SEWING MACHINES.

APPLICATION FILED FEB. 1, 1909.

991,705.

Patented May 9, 1911.

2 SHEETS—SHEET 2.

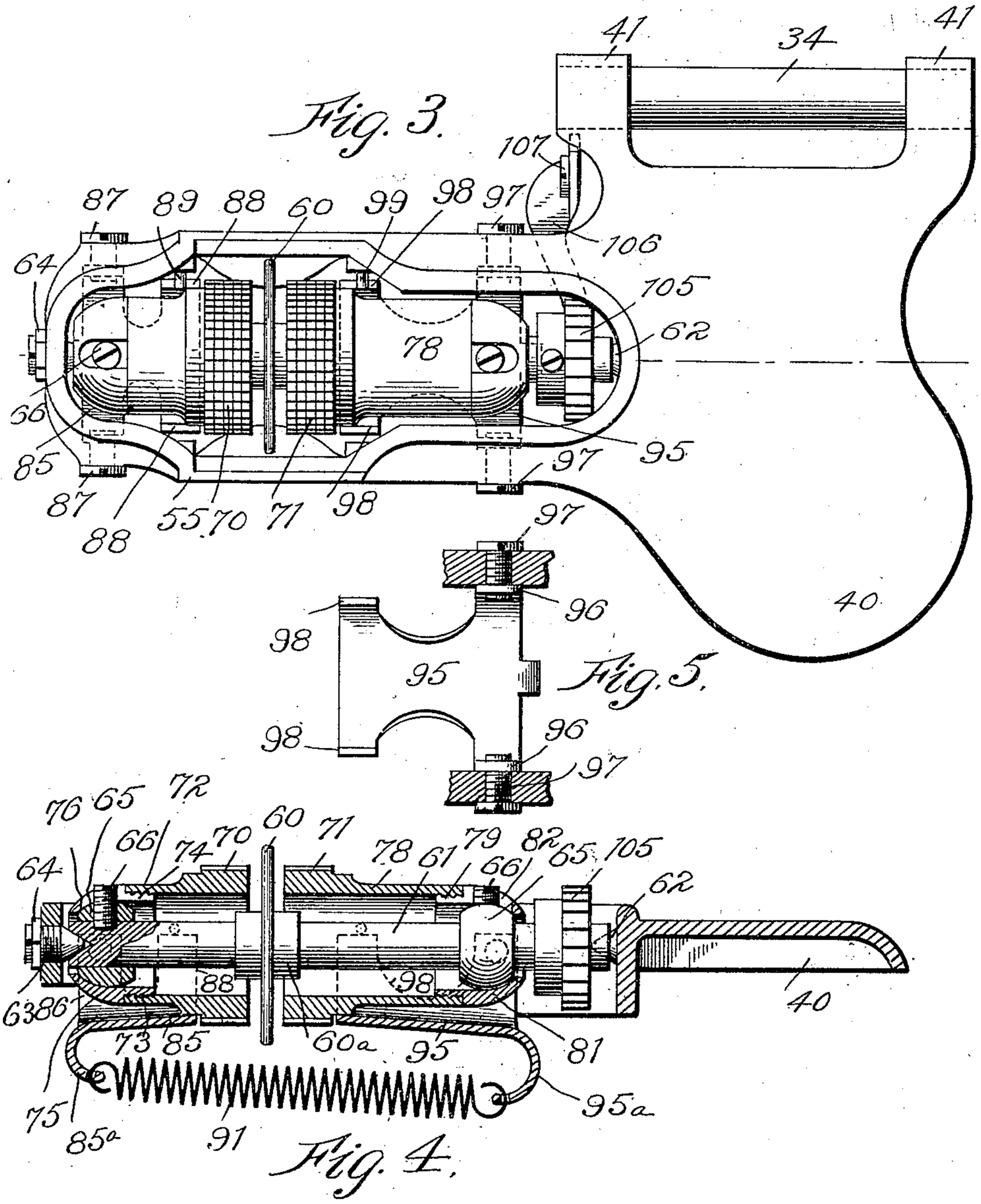

Fig. 3.

Fig. 5.

Fig. 4.

Witnesses
Wm. A. Leggett
H. H. Knight

Charles A. Dearborn
Inventor,
By his Attorneys Knight Bros.

UNITED STATES PATENT OFFICE.

CHARLES A. DEARBORN, OF NEW YORK, N. Y.

FEED MECHANISM FOR SEWING-MACHINES.

991,705. Specification of Letters Patent. Patented May 9, 1911.

Application filed February 1, 1909. Serial No. 475,428.

To all whom it may concern:

Be it known that I, CHARLES A. DEARBORN, a citizen of the United States, resident of New York and borough of Manhattan, county and State of New York, have invented certain new and useful Improvements in Feed Mechanism for Sewing-Machines, of which the following is a specification.

My present invention relates to an improved form of work supporting and feeding mechanism for sewing machines and particularly to the type of sewing machines employed for over-seaming blind stitch work, such type of machine being set forth in prior patents granted to me October 6th, 1906, Nos. 814,025, 814,026 and 814,642.

My improved feed mechanism comprises a ridge-forming rib or disk and two feed devices mounted independently upon opposite sides of said rib or disk in such manner that the work is supported upon said rib or disk and said feed devices and held in operative position against an over-hanging presser foot;—the construction being such that said ridge-forming rib or disk and said presser-foot are capable of relatively yielding, and said feed devices are capable of yielding independently of each other and independently of the ridge-forming rib or disk.

In the preferred construction of my improved feed mechanism, I arrange upon the usual yieldingly mounted work supporting frame, a freely journaled feed shaft having rigidly mounted upon it a ridge-forming disk. This feed shaft is provided with suitable means for imparting to it an intermittent rotation. The spring of the work supporting frame sustains the ridge-forming disk in operative relation to the over-hanging presser foot, which is common to this type of machines. The feed devices are preferably wheels of hollow formation mounted upon hollow shafts or cylinders which encircle the feed shaft and have independent ball and socket joint connections therewith so as to cause both feed wheels to rotate with the shaft and at the same time allow the feed wheels to yield independently of the shaft and ridge-forming disk, independently of each other, and independently of the work supporting frame.

I prefer to provide upon the work supporting frame, two pivotally mounted yokes or cradles which are sustained by a suitable spring into engagement with the under surfaces of the hollow shafts or cylinders of the feed wheels. The spring for said yoke or cradle may be independent for each of the feed rolls, but a common spring may be provided, as in the preferred arrangement of my mechanism, for sustaining both of the yokes or cradles.

The important feature of my present invention is the entire independence of the feed wheels, not only with respect to each other and their supporting frame, but also with respect to the ridge-forming disk, so that in the operation of the machine, inequalities in the work passing over the ridge-forming disk and feed wheels will have an independent effect upon each of these parts, so that neither feed wheel will interfere with the proper operation of the disk, and the disk will not interfere with the proper operation of the feed wheels.

In order that my invention may be fully understood, I will first describe the same with reference to the accompanying drawings and afterward point out the novelty more particularly in the annexed claims.

In said drawings, Figure 1 is a partial side elevation of a blind stitch sewing machine embodying my improvements. Fig. 2 is a front elevation of the same, some of the parts of the machine being omitted. Fig. 3 is an enlarged plan view of the work supporting frame carrying my improved work supporting and feeding mechanisms. Fig. 4 is a vertical transverse sectional view of the same. Fig. 5 is a detail horizontal sectional view of a part of the same, showing one of the pivotally mounted yokes or cradles for a feed wheel.

The main frame of the machine of the type to which my improvements are particularly applicable is formed of a single casting comprising a rigid central base 1, the upwardly extending arm 2 terminating in sleeves or shaft bearings, one of which is shown at 3, and a forwardly extending arm 5 having bearings for the needle rocker shaft 15 and for the looper supporting and operating mechanism which is not shown in the drawings.

10 is the main driving shaft of the machine, journaled in the bearings of the rear arm 2 and having secured at one end the driving pulley 11 and fly wheel 12.

The specific mechanism for operating the needle and looper will not be explained in

the present case, since these parts of the machine form no part of my present invention.

Projecting out from the forward end of base 1 of the machine frame is an auxiliary arm 30 which is rigidly secured to the base by means of set screws or bolts 31. This auxiliary arm 30 is formed at its upper end with two shelves 32 and 33, in which is mounted a pivot shaft 34 projecting a little beyond each of the sleeves 32 and 33.

40 is a horizontal forwardly extending spring sustained work supporting frame. This frame 40 has the rearwardly presented integral sleeves 41 which are journaled upon the projecting ends of the pivot shaft 34 and rest snugly against the sleeves 32 and 33 by which the work support 40 is accurately held in position and is permitted to move up and down upon its pivot within certain limits. Surrounding the pivot shaft 34 is a strong tension spring 45 which sustains the work supporting frame 40 in the usual way as particularly set forth in my above named Patent No. 814,025. This work supporting frame 40 is formed with an integral work supporting horn 55 projecting to the left when viewing the machine from the front. This horn 55 is of hollow formation as set forth clearly in Figs. 3 and 4 of the drawings, for the purpose of receiving and supporting the feed shaft, the ridge-forming rib and the yielding feed wheels, which will now be explained.

100 is the overhanging presser foot secured to a yoke 102 and pivotally mounted upon the sewing machine arm 5 and operated by a cam 121 upon the needle rock shaft 15 in the manner fully explained in my above named Patent No. 814,025. It will be understood that my improved feed mechanism may be employed in a machine in which the over-hanging presser foot 100 is rigid or stationary, without departing from the spirit of my invention, but there are material advantages resulting from the employment of a vibratory presser foot such as set forth in my above named patent, when used with my improved feeding mechanism, so that I prefer to employ this form of presser foot in my present machine.

61 is the feed shaft freely journaled at its ends upon the rigid cone bearing 62 formed integral with the cloth supporting frame at the inner end of the horn, and the adjustable cone-pointed bearing screw 63 threaded into the outer end of the horn 55 and secured at desired adjusted position by a clamp nut 64. It will be clear from Fig. 4 of the drawings that these cone bearings engage the conical recesses formed in the ends of the feed shaft 61.

60 is the ridge-forming disk mounted upon a hub 60^a rigidly secured upon the feed shaft 61 at a point between the ends of said shaft. This ridge-forming disk 60 is designed to engage the work beneath the over-hanging presser-foot 100 and press the ridge or rib of work up through the opening in the presser foot into proper relation to the needle and looper mechanisms, by which the over-seaming blind stitching is performed. Adjacent to each end of the feed shaft 61 is secured a bearing collar 65 having a segmental spherical bearing surface. Each of these bearing collars 61 is secured rigidly upon the feed shaft 61 by a set screw 66.

70 and 71 are independent hollow feed wheels arranged upon opposite sides of the ridge-forming disk 60. The feed wheel 70 has formed integral with it, or otherwise attached to it a laterally extending hollow shaft or cylinder 72 which is interiorly threaded at 73 to receive the threaded end 74 of the socket bearing 75 which has an inner spherical bearing surface fitting upon the bearing surface of one of the collars 65. This bearing socket 75 is formed with a longitudinal slot 76 through which one of the set screws 66 projects to complete the ball and socket joint connection between the feed wheel 70 and the feeding shaft 61, said slot 76 permitting the feed wheel 70 to move approximately radially to the shaft 61. The feed wheel 71 is formed integral with or otherwise attached to a hollow shaft or cylinder 78 which is interiorly threaded at 79 to receive the threaded portion 80 of the bearing socket 81 which is mounted upon the other bearing collar 65, the socket 81 being slotted at 82 to engage the outer end of the other set screw 66, to complete the ball and socket joint connection of the feed wheel 71 with the shaft 61. Each feed wheel 70 and 71 is sustained in operative relation by a spring actuated supporting yoke or cradle, as will now be explained.

85 is the yoke or cradle for the feed wheel 70. This yoke or cradle 85 is of concave formation having the arms 86 projecting upwardly and journaled upon set screws 87 in the work supporting horn 55. The yoke or cradle 85 also has two upwardly projecting arms 88 partially encircling the hollow hub or shaft portion 72 of the feed wheel 70, a stop pin 89 projecting inwardly from the frame to engage one of said arms 88 and limit the upward movement of the yoke or cradle 85.

The downwardly and inwardly curved arm 85^a projects from the bottom of the yoke or cradle 85 and has attached to it one end of the contractile spring 91, the other end of said spring being attached to the yoke or cradle of the opposite feed wheel as will now be explained. 95 is the yoke or cradle for the opposite feed wheel 71. This yoke or cradle is of substantially the same construction as the yoke or cradle 85 just described, and is shown more in detail in Fig. 5 of the drawings. This yoke or cradle has

upwardly presented curved arms 96 which are journaled to the work supporting horn 55 upon the set screw 97, and the upwardly projecting arms 98 which embrace the hub or hollow shaft 78 of feed wheel 71 as shown. A stop pin 99 upon the frame 55 engages one of the arms 98 and limits the upward movement of the yoke or cradle 95. The downwardly and inwardly curved arm 95[a] formed integral with or otherwise attached to the yoke or cradle 95 has the opposite end of the spring 91 attached to it as shown. The stop pins 89 and 99 are so arranged in the horn 55 that the upward limit of movement of the yokes or cradles 85 and 95 will sustain the feed wheels 70 and 71 approximately concentric with the feed shaft 61. It will be observed that the feed wheels 70 and 71 are arranged at sufficient distances upon opposite sides of the ridge-forming disk 60 to permit their free movement eccentrically or radially of the feed shaft 61.

105 is a small ratchet wheel secured to the inner end of the feed shaft 61.

106 is a pawl journaled at 107 upon an upwardly extending rock arm 108 formed integral with a rocking sleeve 109 having a downwardly projecting rock arm 110 to which is pivoted at 111 the forward end of a curved pitman 112 pivotally connected at 113 with the longitudinal movable rocking arm or bar 133 actuated by an eccentric 137 upon the main shaft 10. This arm or bar 133 constitutes the main part of the upper feeding device as set forth in my above named Patent No. 814,642 and will not be further described herein. By the described connection of the ratchet feed mechanism of my present improvement with the upper feeding bar, it will be understood that the upper and lower feeding mechanisms will operate in unison. The feeding pawl 106 has a heel 106[a] with which connects a small spring 115 extending from a stationary pin (not shown) upon the machine frame.

The operation of my improved feed mechanism will be clear from the following explanation. In performing blind stitching work with a machine of the type to which my improvements are applied, it will be understood that the work is presented beneath the overhanging presser foot 100 and above the ridge-forming disk 60 and feeding wheels 70 and 71, said feeding wheels and rib having imparted to them an intermittent motion for passing the work in step-by-step manner beneath the presser foot, the needle and looper mechanisms being so timed to perform their work between the successive steps of the feed. As the work passes beneath the presser foot, any uneven places such as cross seams passing over the feeding wheels, will cause the feeding wheels to move downwardly just sufficiently to accommodate the increase in thickness, the spring 91 normally holding the wheels in feeding engagement with the lower surface of the work, and permitting their independent yielding under the action of said inequalities. The feeding wheels being entirely independent of the ridge-forming disk, it will be clear that the yield of the feeding wheels will not affect the position of the ridge-forming rib which is effectively held up in working relation to the overhanging presser-foot to coöperate with the needle in the performance of accurate blind stitching. The ridge-forming rib is permitted to yield to the extent necessary by the yielding feature of the work supporting plate or frame, but the yield under the action of inequalities in the line of the seams has no effect whatever upon the independent feeding wheels which are sustained in working relation to the work by their independent spring or springs.

The important feature of my invention is the independence of the feeding devices upon opposite sides of the ridge-forming rib, both with respect to the rib and with respect to each other. There must be a relative yielding action between the presser-foot and rib, but either member may do the yielding without departing from the scope of my invention, and in all cases the feeding devices must yield independently and relatively to the rib, the presser foot and each other.

What I claim is:—

1. In a sewing machine, the combination of a presser foot, and a ridge-forming rib adapted to engage the work beneath the presser foot, said rib and presser foot being capable of yielding relatively to each other, with feeding devices mounted upon opposite sides of the ridge-forming rib beneath the presser foot, and means for yieldingly forcing the feeding devices toward the presser foot, said feeding devices being constructed to yield independently of the presser foot, the rib and each other.

2. In a sewing machine, the combination of a presser foot, a yieldingly mounted work supporting frame, a ridge-forming rib carried by said frame and adapted to engage the work beneath the presser foot, and two independent feeding wheels arranged in said frame upon opposite sides of said ridge-forming rib and adapted to yield independently of said frame, said rib and each other.

3. In a sewing machine, the combination of a presser foot, with a yieldingly mounted work supporting frame, a feed shaft journaled in said frame, a ridge-forming rib sustained by said frame and adapted to engage the work beneath said presser foot, a pair of spring sustained hollow feeding wheels arranged upon opposite sides of said ridge-forming disk and having driving connections with said shaft, the wheels being

mounted to yield independently of said rib and of each other.

4. In a sewing machine, the combination of a presser foot, with a yieldingly mounted work supporting frame, a feed shaft journaled in said frame, a ridge-forming rib sustained by said frame in engagement with the work beneath said presser foot, a pair of hollow feeding wheels arranged upon opposite sides of said ridge-forming rib and having driving connections with said shaft, the wheels being mounted to yield transversely of said shaft independently of said rib and of each other, and spring mechanism for sustaining said wheels in operative position.

5. In a sewing machine, the combination of a presser foot, with a yieldingly mounted work supporting frame, a feed shaft journaled in said frame, a ridge-forming disk mounted upon said shaft and held thereby in engagement with the work beneath said presser foot, a pair of hollow feeding wheels encircling said shaft upon opposite sides of said ridge-forming disk and having universal joint driving connections with said shaft, the wheels being mounted to yield independently of said disk and of each other, and spring mechanism for sustaining said wheels in operative position beneath the presser foot.

6. In a sewing machine, the combination of a presser foot, with a work supporting frame, a feed shaft journaled in said frame, means for imparting intermittent motion to said shaft, a ridge-forming rib, and feeding wheels arranged upon opposite sides of said rib and having driving connections with said shaft, said wheels being mounted to yield eccentrically of said shaft and independently of said rib and of each other.

7. In a sewing machine, the combination of a presser foot, with a work supporting frame, a feed shaft journaled in said frame, means for imparting intermittent motion to said shaft, a ridge-forming disk carried upon said shaft, and hollow feeding wheels encircling said shaft upon opposite sides of said disk and having driving connections with said shaft, said wheels being mounted to yield eccentrically of said shaft and independently of said disk and each other.

8. In a sewing machine, the combination of a presser foot, with a spring sustained work supporting frame, a feed shaft journaled in said frame, means for imparting intermittent motion to said shaft, a ridge-forming disk carried upon said shaft, hollow feeding wheels encircling said shaft upon opposite sides of said disk and having universal joint driving connections with said shaft and spring sustained yokes or cradles mounted in said frame and yieldingly holding said wheels to their work.

9. In a sewing machine, the combination of a presser foot, with a work supporting frame, a ridge-forming rib carried by said frame, a pair of feed wheels arranged upon opposite sides of said rib and capable of yielding transversely of their axis of rotation, means for driving said wheels, and independent spring sustained yokes or cradles pivotally mounted upon said work supporting frame and supporting said feed wheels in operative position.

10. In a sewing machine, the combination of a presser foot, with a work supporting frame, a feed shaft journaled in said frame and carrying a ridge-forming disk, means for operating said shaft, a pair of hollow feed wheels encircling said shaft upon opposite sides of the disk and capable of yielding transversely of said shaft driving connections between said feed wheels and said shaft, and a pair of independent spring sustained yokes or cradles pivotally mounted upon said work supporting frame beneath said feed wheels for supporting said wheels in operative position.

11. In a sewing machine, the combination of a presser foot, with a yieldingly mounted work supporting frame, a feed shaft journaled in said frame and carrying a ridge-forming disk, means for operating said shaft, a pair of hollow feed wheels encircling said shaft upon opposite sides of the disk and capable of yielding transversely of said shaft driving connections between said feed wheels and said shaft, independent yokes or cradles pivotally mounted upon said work supporting frame and engaging said feed wheels, limiting stops for said yokes or cradles, and a spring connecting said yokes or cradles.

CHARLES A. DEARBORN.

Witnesses:
LAURA E. MONK,
WM. E. KNIGHT.