H. C. MOULTON.

NEEDLE ACTUATING AND SHOGGING MECHANISM FOR BLINDSTITCH SEWING MACHINES.

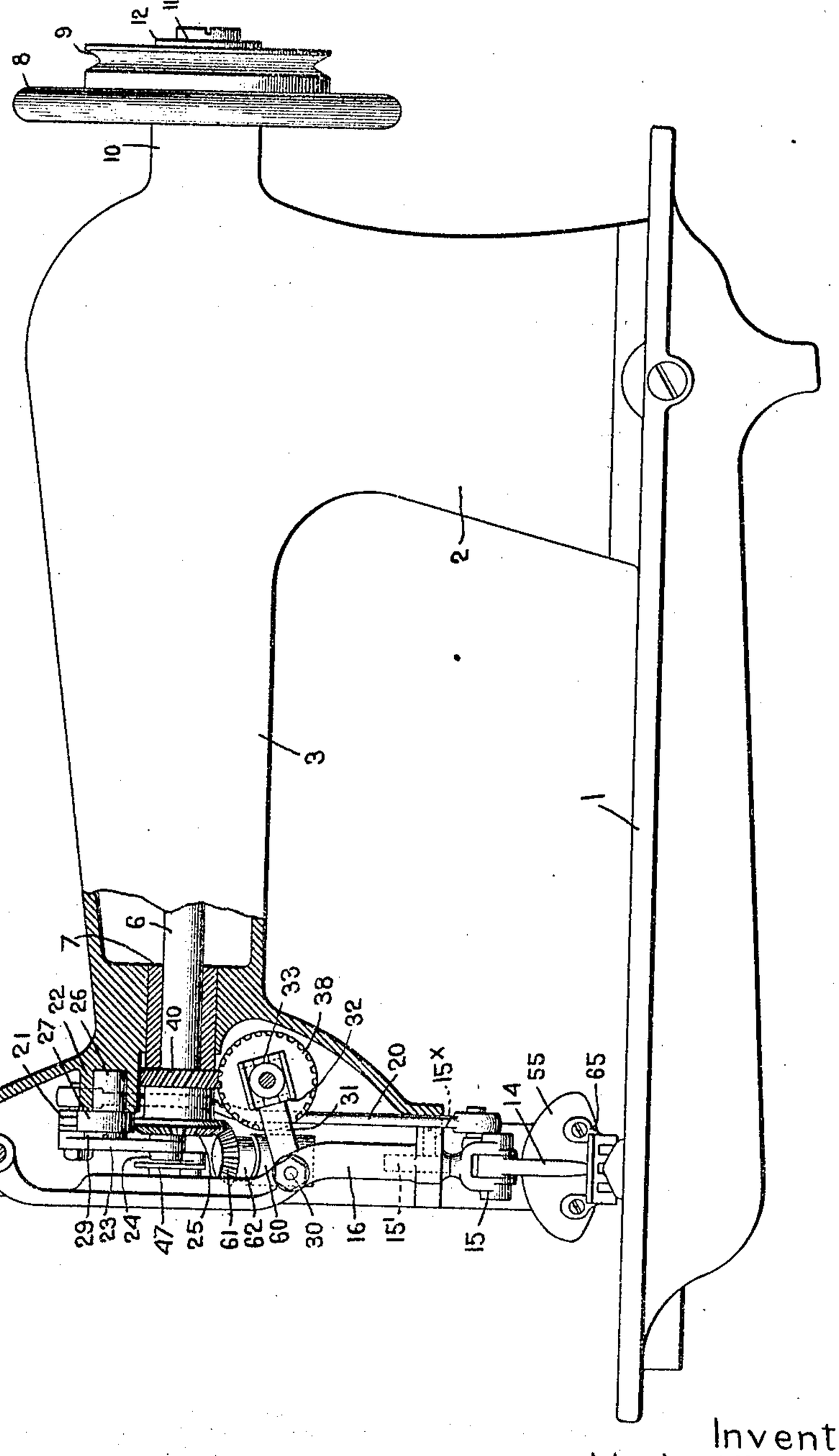
APPLICATION FILED SEPT. 8, 1915.

1,298,246.

Patented Mar. 25, 1919.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

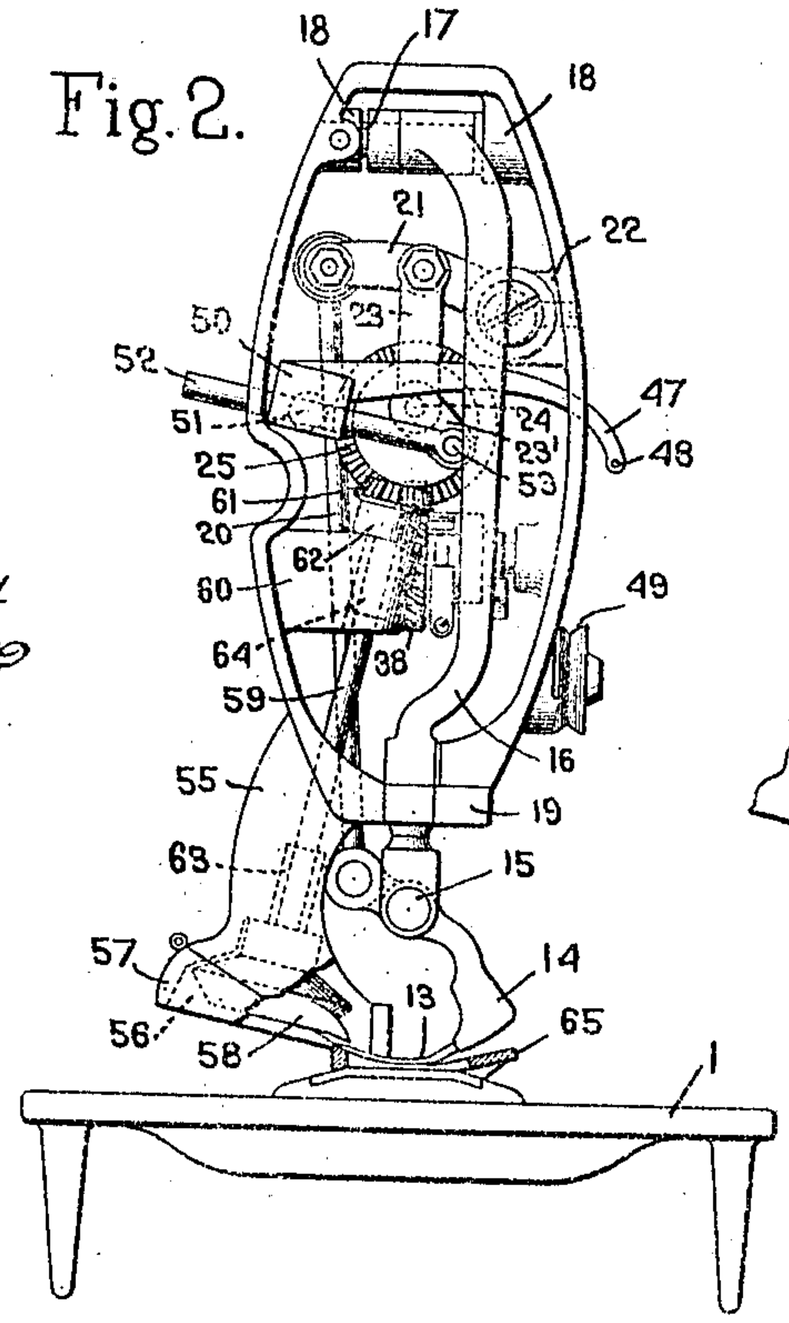


Fig. 7.

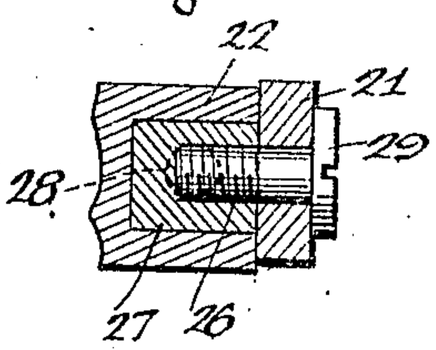


Fig. 3.

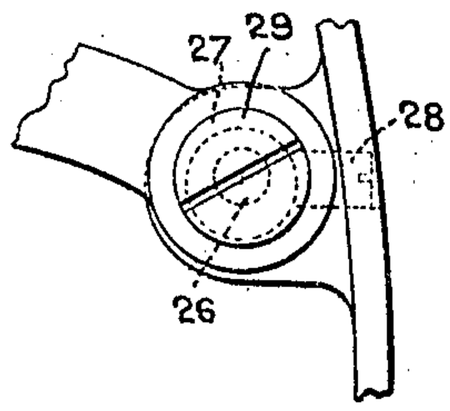


Fig. 4.

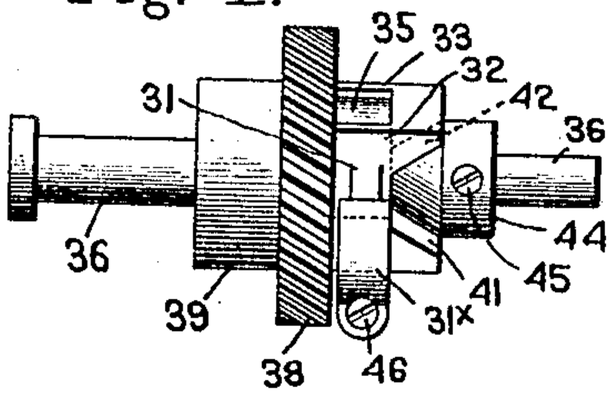


Fig. 5.

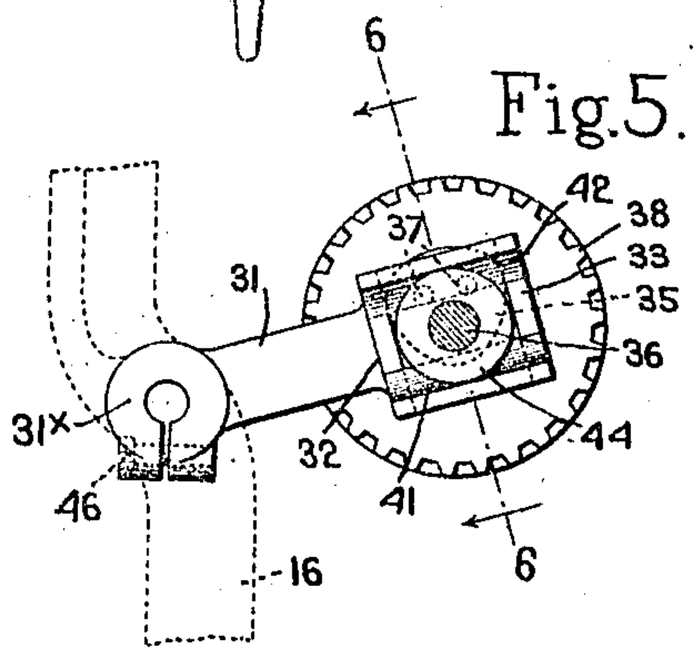
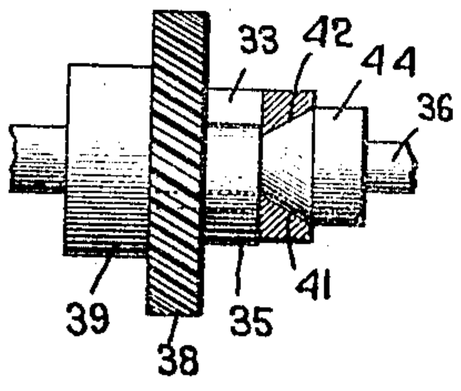


Fig. 6.



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UNITED STATES PATENT OFFICE.

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NEEDLE ACTUATING AND SHOGGING MECHANISM FOR BLINDSTITCH SEWING-MACHINES.

1,298,246. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed September 8, 1915. Serial No. 49,622.

To all whom it may concern:

Be it known that I, HARLEY C. MOULTON, a citizen of the United States, and resident of Dorchester, county of Suffolk, State of Massachusetts, have invented an Improvement in Needle Actuating and Shogging Mechanism for Blindstitch Sewing-Machines, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to improvements in stitch forming mechanism for blind stitch sewing machines and the principal object thereof is to provide simplified mechanism for supporting and for actuating the curved oscillating needle and the complementary stitch forming mechanism.

A further object of the invention consists in providing such a construction for the stitch forming mechanism that it may be assembled with a minimum amount of machining, the parts also being so arranged that adjustment may be made of the connections between relatively removable parts to compensate for wear, whereby accurate positioning of the parts may be maintained.

Other objects and features of the invention will more fully appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

The drawings illustrate a preferred embodiment of my invention as incorporated in the head and arm of a blind stitch sewing machine of the "Arbetter" type, the work presenting mechanism having been omitted from the illustration.

Any suitable work presenting mechanism may be utilized in connection with the stitch forming mechanism of my invention but preferably feeding and bender mechanisms constructed in accordance with the disclosure of my co-pending applications Nos. 49,621 and 49,623, filed September 8, 1915, respectively, is associated with this improved stitch forming mechanism.

In the drawings;

Figure 1 is a side elevation of the bed plate and arm of a sewing machine, the head being partly in section to disclose more clearly the actuating mechanism for the curved oscillatory and vibrating needle and for rotating the complementary stitch forming mechanism,

Fig. 2 is an end view showing the head of the machine with the face plate removed,

Fig. 3 is a detail view of the adjustable pivotal support for the needle oscillating mechanism,

Fig. 4 is a detail view of mechanism for vibrating or shogging the needle laterally,

Fig. 5 is a side elevation of the needle shogging mechanism showing its connection to the needle bar supporting lever, and,

Fig. 6 is a detail view partly in section of the shogging mechanism, on line 6—6 Fig. 5.

Fig. 7 is a vertical sectional view through the bracket and stud for adjusting the needle bar actuating lever illustrated in Fig. 3.

The sewing machine embodying the preferred embodiment of the invention illustrated herein includes the usual bed plate 1 from the rear portion of which rises the standard 2 having an overhanging arm 3 terminating in a head 4 which incloses the mechanism for supporting and actuating the needle, the take-up and upper feeding mechanism, (not shown.)

The stitch forming mechanism is actuated from a main shaft 6 extending longitudinally of the arm and journaled in suitable bushings therein, the bushing 7 adjacent the head of the machine preferably contacting with the hub of the gear which actuates the shogging mechanism. The shaft 6 is provided at its opposite end with the usual hand wheel 8 and driving pulley 9 which may be formed integral and slidably keyed upon the end of the shaft 6. The inner face of the hub of the hand wheel 8 preferably abuts against the surfaced end of an extension 10 of the rear end of the arm 3, and the shaft 6 preferably terminates a short distance within the outer face of the pulley 9 so that a screw 11 seated in the end of the shaft 6 and having its head bearing against a washer 12 which engages the face of the pulley 9 may serve to adjust and to maintain the face of the gear which actuates the shogging mechanism in contact with the end of the bushing 7. By this construction means are provided whereby the

shaft may be assembled in the machine without the necessity of employing extreme accuracy usually required in its construction but without sacrificing any of the accuracy of its relation to the parts which are actuated by it.

The oscillating needle mechanism comprises the usual curved needle 13 which is mounted in the end of a needle bar 14 which is pivotally mounted preferably near its upper end in a fork 15 having a stem extending into and adjustably secured by a set screw 15× to the lower end of a needle bar supporting lever 16 which preferably is pivotally mounted at its upper end upon a transverse shaft 17 supported in oppositely disposed inwardly projecting bosses 18 in the upper portion of the head of the machine. The lower end of the needle bar is surfaced to oscillate between a corresponding machined surface in the bottom of the head and a surfaced guide 19 which is secured to the lower portion of the head. The needle bar supporting lever 16 may be offset, or curved as illustrated herein, to avoid interference with other parts which are within the head.

The needle bar preferably is oscillated through a link 20 which is pivotally connected at its lower end to the upper end of the needle bar and at its upper end by a universal connection to the end of a transverse substantially horizontal lever 21, which is pivoted at its opposite extremity upon a preferably adjustable pivot carried by a boss 22 projecting forwardly from the inner upper portion of the head. The lever 21 may conveniently be oscillated vertically by a link 23 pivotally connected to it a proper distance from its ends and to a stud 24 carried directly or indirectly by the main shaft but disposed eccentrically to the axis thereof.

As illustrated herein a stud 24 carrying the take-up actuating means is seated eccentrically in the end of the main shaft 6 said stud carrying a head which is embraced by the lower end of the link 23 which actuates the needle oscillating lever 21.

In order to provide for the adjustment of the needle actuating lever 21 the end of the lever 21 is apertured to fit the stem of a screw 29 which is seated in a screw threaded aperture 26 formed eccentrically in a bushing 27 which is seated in a suitable aperture in a lug 22 extending inwardly from the wall of the head of the machine. The bushing is maintained in adjusted position by means of a set screw 28 passing through the wall of the head and abutting against the side of the bushing. By loosening the set screw 28 the bushing may be adjusted rotarily by a screw driver applied to the slot of the screw 29. When the desired adjustment is effected the screw 28 is set up against the bushing to maintain the parts in adjusted position. This adjustment serves to raise and lower the fulcrum of the needle bar actuating lever 21 so that the field of oscillation of the needle may be varied to cause the needle to coöperate properly with the complemental stitch forming mechanism. A very slight adjustment of the fulcrum of the lever 21 is sufficient to serve this purpose as the amount of this adjustment is multiplied by the relative proportions of the needle bar actuating lever and the needle bar 21 so that from $\frac{1}{32}$ to $\frac{1}{16}$ of an inch of excentricity of the axis of the screw 29 to the axis of the bushing 27 is usually ample.

The needle shogging mechanism, as illustrated herein preferably consists of means actuated from the main shaft directly connected to the needle bar supporting lever at a suitable point intermediate of its ends. In the illustrative embodiment of the invention the needle bar supporting lever 16 is connected by a pivotal stud 30 to one end of a link 31 which is provided at its opposite end with a head having parallel transverse flanges 32, 33 adapted to engage the surface of a cam 35 fixedly secured to a transverse shaft 36 mounted in suitable bearings in internal bosses in the head 4.

For convenience in construction and assembling the cam 35 may be secured by set screws 37 to the face of a worm gear 38 having a hub 39 fixedly secured upon the shaft 36, the worm gear 38 meshing with a worm wheel 40 fixed upon the main shaft 6 preferably closely between the hub of the beveled gear 25 and the end of the bushing 7.

In order to maintain the proper endwise movement of the needle shogging link 31, and to take up wear, the cam-engaging head of the link 31 is preferably provided with parallel longitudinal beveled ways, 41, 42 which are engaged by the conical face of a hub 44 adjustably secured upon the shaft 36 by a set screw 45. By reason of the construction the link 31 is caused, by the cam 35, to have a lengthwise sliding movement on the conical face of the hub 44 and such pivotal movement about the axis of the shaft 36 as is necessitated by reason of the arcuate movement of its pivotal connection to the needle bar supporting lever 25.

The link 31 is secured to the lever 17 preferably by a screw passing through the lever and engaging a screw threaded opening in the split end 31× of the link 31 a set screw 46 being provided to secure the proportions of the lever end 36 together and to clamp the same upon the screw in such a manner as to prevent the unscrewing of the same by the relative movement of the link 31 and lever 16.

Any suitable take-up mechanism may be provided; a convenient form which is illus-

trated herein comprises a take-up arm 47 having at its outer end an eye 48, suitably positioned in respect to the tension 49 and the thread guides leading to the needle, and at its inner end a preferably integral block 50 provided with a pivotal stud 51 seated in a suitable boss in the sewing machine head, the axis of the stud 51 being preferably in the same horizontal plane as the axis of the main shaft. The block 50 is provided with a transverse aperture in which is slidably seated a rod 52 which is pivotally connected to a stud 53 on the end of an arm 23′, which conveniently may be an angularly disposed extension of the needle bar actuating link 23. In operation, the rotation of the stud 24 about the axis of the main shaft will impart a combined vertical and lateral movement to the arm 23′ which will give a variable sliding and vertically oscillating movement to the rod 52, the oscillating movement which is imparted to the take up arm 47 being so timed, by reason of the relative proportions of the parts of the actuating mechanisms, as to give the proper movement to the take up arm. It will be noted that inasmuch as the take up arm is actuated from the member which oscillates the needle bar, the synchronism of the movement of the take up with that of the needle is at all times insured.

An important feature of the present invention resides in a simplified construction of the complementary stitch forming mechanism which coöperates with the oscillating needle and which in blind stitching machines of this type is usually in the form of a rotary hook containing the bobbin for supplying the shuttle thread.

In machines heretofore constructed the hook bracket and means for actuating the hook have comprised a relatively large number of parts which have required accurate construction, involving much machine work, and careful assembling.

By the present invention the number of parts have been reduced to a minimum and have been so disposed as to permit their assemblage with as little machining as possible.

In the preferred embodiment of the invention illustrated herein the hook bracket 55 is in the form of a downward and lateral extension of the head 4, preferably being cast integrally with the head. It is enlarged at its lower end and provided with a suitable recess 56 to inclose the rotary hook. The lower portion of the hook bracket may desirably be beveled, as shown in Fig. 2, and a hinged cover 57 provided to permit the replacement of the bobbin in the hook. The hook 58 is preferably secured directly to the end of an actuating shaft 59 which is journaled in bearings formed respectively in the hook bracket 55 and a lug or bracket 60 projecting from the inner rear wall of the head 4, the shaft 59 being provided at its upper end with a beveled gear 51 meshing with the beveled gear 25, which is located on the end of the main shaft.

The gear 61 is preferably provided with a hub 62 of sufficient length to rest upon the upper face of the bracket 60, and the shaft 59 may be adjustably secured to said hub by a set screw to permit vertical adjustment of the hook, if necessary to coöperate properly with the needle.

The bearings in the hook bracket 55 and lug 60 may be provided with suitable bushings 63, 64.

By this simplified construction the mechanism for supporting and actuating the hook is most easily and accurately assembled as the apertures for the hook shaft may be drilled at a single operation, the drill first passing through the hook bracket 55 (from the bottom upwardly) thence through the lug or bracket 60.

The presser foot 65 may be and preferably is, secured to the slabbed-off lower front face of the hook bracket as is usual in machines of this type.

I further contemplate using in this improved stitch forming mechanism a rotary hook having a beak, the point of which does not extend beyond the circle of the periphery of the body of the hook whereby the hook may be mainly constructed upon a usual form of screw cutting machine without the necessity of the use of special hook forming mechanism.

As heretofore stated any suitable mechanism may be employed for presenting the work to the stitch forming mechanism above described, and in the interest of clearness of illustration of the stitch forming mechanism all work presenting mechanism has been omitted from the disclosure.

It is to be understood that the mechanism disclosed herein is illustrative of a preferred embodiment of my invention but is not restrictive and that various changes in form, construction and relation of parts and the substitution of equivalent mechanisms may be made within the contemplation of the following claims.

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

1. In a blind stitch sewing machine comprising a bed plate, an overhanging arm and head, a main shaft in said arm and head, a pivotally mounted needle bar carrying a curved needle, a needle bar actuating lever pivotally mounted in and inclosed within said head, means connecting said needle bar actuating lever to said needle bar and means connecting the main shaft to said needle bar actuating lever for oscillating the latter.

2. In a blind stitch sewing machine a curved needle, a pivotally mounted needle

bar, a needle bar actuating lever, means for adjusting the pivotal support of said needle bar actuating lever.

3. In a blind stitch sewing machine a curved needle, a pivotally mounted needle bar, a needle bar actuating lever, means for adjusting the pivotal support of said needle bar actuating lever consisting of an eccentric pivotal bearing and means for retaining the same in adjusted position.

4. In a blind stitch sewing machine comprising a curved needle and an oscillating needle bar carried by a needle bar supporting lever pivotally mounted in the head of the machine, means for vibrating the needle laterally actuated by mechanism within the head of the machine.

5. In a blind stitch sewing machine comprising a bed plate, an overhanging arm and head and a main shaft in said arm and head, a needle bar supporting lever pivotally mounted in said head to vibrate transversely of the line of feed, a needle bar having a curved needle pivotally mounted upon said needle bar and means for oscillating said needle bar, means inclosed within said head for vibrating said needle bar supporting lever comprising a cam, a link pivotally connected to said needle bar supporting lever and embracing said cam and means for driving said cam from the main shaft of the machine.

6. In a blind stitch sewing machine comprising a curved needle and an oscillating needle bar carried by a needle bar supporting lever pivotally mounted in the head of the machine, means for vibrating the needle laterally actuated by mechanism within the head of the machine consisting of a cam, a link having cam engaging means and guiding means adapted to permit reciprocation and oscillation of said link in respect to the shaft of said cam.

7. In a blind stitch sewing machine comprising a curved needle and an oscillating needle bar carried by a needle bar supporting lever pivotally mounted in the head of the machine, means for vibrating the needle laterally actuated by mechanism within the head of the machine consisting of a cam, a link having cam engaging means and oppositely inclined parallel guides, and a cone on the shaft of said cam engaging said guides.

8. In a sewing machine comprising a head, a curved oscillating needle supported therein and means for actuating said needle, a hook bracket integral with said head, a hook carrying shaft rotatably mounted therein and intermeshing beveled gears respectively upon the hook carrying shaft and the main shaft adapted to rotate the hook shaft from the main shaft of the machine.

9. In a blind stitch sewing machine comprising a bed plate, an overhanging arm and head, a main shaft rotatably mounted in said arm extending into said head, a stud carried by said main shaft eccentrically of its axis, a needle bar supporting lever pivotally mounted in said head, a needle bar having a curved needle pivotally mounted upon said needle bar supporting lever, a needle bar actuating lever pivotally mounted in said head and extending transversely thereof, means connecting said needle bar actuating lever to said needle bar and means for oscillating said needle bar actuating lever from said stud.

10. In a blind stitch sewing machine comprising a bed plate, an overhanging arm and head, a main shaft rotatably mounted in said arm extending into said head, a stud carried by said main shaft eccentrically of its axis, a pivotally mounted needle bar having a curved needle, means for oscillating said needle including a needle bar actuating lever pivotally mounted in the head of the machine, a take-up pivotally mounted in the head of said machine and a link mounted on said stud having arms operably connected respectively to said needle bar actuating lever and to said take-up.

11. In a blind stitch sewing machine comprising a bed plate, an overhanging arm and head, a main shaft rotatably mounted in said arm extending into said head, a stud carried by said main shaft eccentrically of its axis, a pivotally mounted needle bar having a curved needle, means for oscillating said needle including a needle bar actuating lever pivotally mounted in the head of the machine, a take-up having at its end a block pivotally mounted in the head of the machine, said block having a transverse aperture therethrough, a link mounted upon said eccentric stud having an arm connected to said needle bar actuating lever and another arm connected to a rod reciprocably mounted in the aperture in said block.

12. In a blind stitch sewing machine comprising a bed plate and an overhanging arm and head, a main shaft in said arm having a spiral gear upon its end within the head of the machine, a needle bar supporting lever pivotally mounted in the upper portion of the head of the machine, a needle bar carrying a curved needle pivotally mounted in the lower end of said needle bar supporting lever, means including a stud carried eccentrically by said main shaft for oscillating said needle bar, a countershaft within said head having a gear coöperating with said spiral gear, a cam on said countershaft and a link connecting said cam to said needle bar supporting lever.

13. In a blind stitch sewing machine comprising a bed plate and an overhanging arm and head, a main shaft in said arm having beveled and spiral gears upon its end

within the head of the machine, a needle bar supporting lever pivotally mounted in the upper portion of the head of the machine, a needle bar carrying a curved needle pivotally mounted in the lower end of said needle bar supporting lever, means including a stud carried eccentrically on the end of said main shaft for oscillating said needle bar, a countershaft within said head having a gear cooperating with said spiral gear, a cam on said shaft and a link connecting said cam to said needle bar supporting lever, a bracket integral with said head, a shaft carrying a rotary hook journaled in said bracket, and a gear on said hook shaft engaging the beveled gear on said main shaft.

14. In a blind stitch sewing machine comprising a bed plate and an overhanging arm and head, a main shaft in said arm having beveled and spiral gears upon its end within the head of the machine, a needle bar supporting lever pivotally mounted in the upper portion of the head of the machine, a needle bar carrying a curved needle pivotally mounted in the lower end of said needle bar supporting lever, means including a stud carried eccentrically of the end of said main shaft for oscillating said needle bar, a countershaft within said head having a gear cooperating with said spiral gear, a cam on said shaft and a link connecting said cam to said needle bar supporting lever, a bracket integral with said head, a shaft carrying a rotary hook journaled in said bracket, a take-up pivotally mounted in said head and means operable by the eccentric stud upon said main shaft for actuating said take-up.

15. In a blind stitch sewing machine comprising an oscillatory needle bar carrying a curved needle and means for oscillating the same, needle bar supporting means and means for vibrating said needle bar supporting means laterally comprising a cam, a cam shaft, means for actuating said cam shaft, a cone adjustably mounted upon said cam shaft, and a link pivotally secured to said needle bar supporting means having means engaging said cone whereby wear may be taken up by adjustment of the cone upon the cam shaft.

16. In a blind stitch sewing machine comprising a bed plate having an overhanging arm and head, a main shaft in said arm having a spiral gear on its end near said head, a needle bar supporting lever pivotally mounted on the upper portion of the head of the machine, a needle bar carrying a curved needle pivotally mounted on the lower end of said needle bar supporting lever, means for oscillating said needle bar, a cam shaft mounted in said head transversely of said main shaft and having a spiral gear engaging the spiral gear for the main shaft, a cam upon said cam shaft, a link pivotally connected at one end to said needle bar supporting lever and having means engaging said cam, a cone adjustably mounted upon said cam shaft and inclined ways upon said link engaging said cone.

17. In a sewing machine having a vibratory instrumentality, means for actuating the same comprising a cam, a cam shaft, means for actuating said cam shaft, a cone adjustably mounted upon said cam shaft and a link pivotally secured to said vibratory instrumentality having means engaging said cam and means engaging said cone whereby wear may be taken up by adjustment of the cone upon the cam shaft.

18. In a sewing machine having a vibratory instrumentality, means for actuating the same comprising a cam, a cam shaft, means for actuating said cam shaft, a cone adjustably mounted upon said cam shaft, a link pivotally secured at one end to said vibratory instrumentality and having a slot adjacent its opposite end to receive said cam shaft, means upon said link engaging said cam and beveled walls adjacent said slot adapted to engage said cone whereby wear may be taken up by adjustment of the cone upon the cam shaft.

In testimony whereof I have signed my name to this specification.

HARLEY C. MOULTON.