Dec. 8, 1936. W. MYERS 2,063,264

SEWING MACHINE

Filed Oct. 8, 1935 2 Sheets-Sheet 1

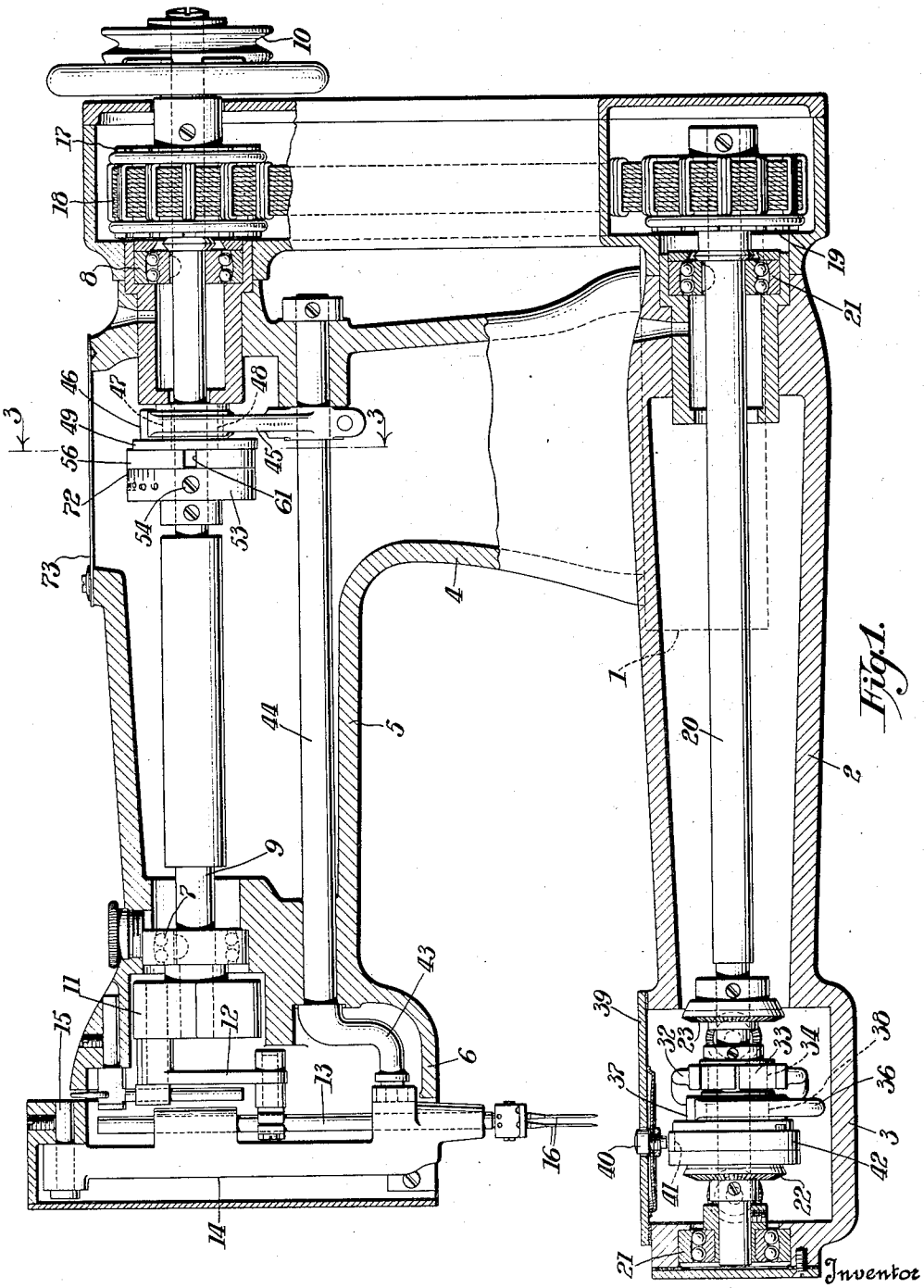


Fig. 1.

Witness:
Godfrey Reinig

Inventor
Walter Myers
By Henry J. Miller
Attorney

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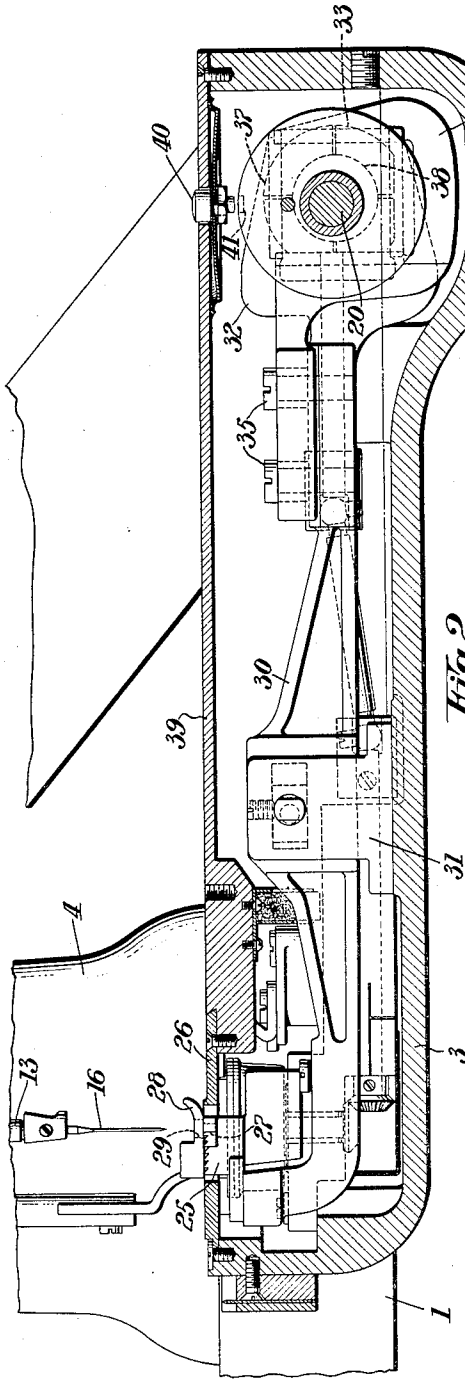


Fig. 2.

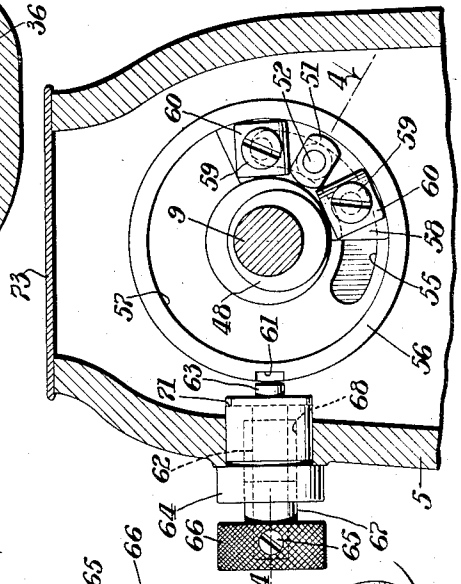


Fig. 3.

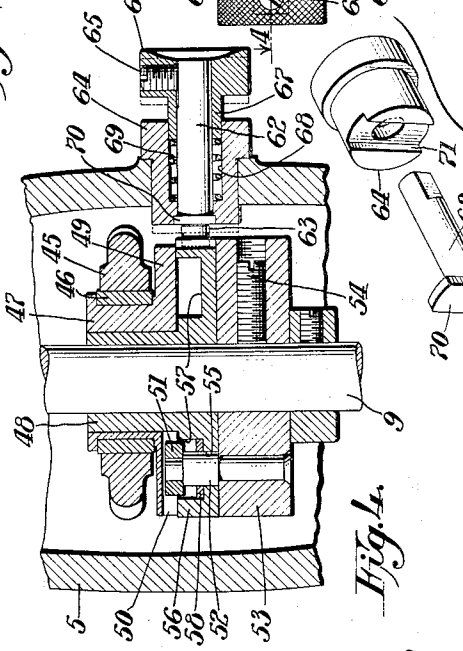


Fig. 4.

Fig. 5.

Inventor
Walter Myers

Witness:
Godfrey Peters

By Henry J. Miller
Attorney

Patented Dec. 8, 1936 2,063,264

UNITED STATES PATENT OFFICE

2,063,264

SEWING MACHINE

Walter Myers, Bridgeport, Conn., assignor to The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

Application October 8, 1935, Serial No. 44,002

20 Claims. (Cl. 112—210)

This invention relates to improvements in sewing machines and more particularly in compound feeding mechanisms in which a plurality of work-engaging devices cooperate in advancing the work past the stitch-forming mechanism.

In a commercially well known type of compound feeding mechanism, the usual thread-carrying needle has lateral work-feeding movements in unison with the work-advancing movements of a feed-dog, thereby insuring against relative movement of superposed plies of work being secured by stitching. However, difficulty has been experienced heretofore in connection with compound feeding mechanisms to properly time the lateral movements of the needle with the work-advancing movements of the feed-dog, either after initial assembly of the machine parts or when changing from one stitch length to another for different classes of work.

It is a primary object of the present invention to provide for concomitantly adjusting a plurality of actuating eccentrics as to eccentricity.

A further object of the invention is to provide means for conveniently and accurately adjusting the amplitude of work-advancing movements of the feeding elements of a compound feeding mechanism.

A still further object of the invention is to provide a compound feeding mechanism adapted for high speed operation, with a minimum overthrow of the parts of said mechanism.

A more specific object of the invention is to provide a feed-off-arm sewing machine with a compound feeding mechanism including a work-engaging feed-dog and a work-feeding thread-carrying needle.

With the above and other objects in view, as will hereinafter appear, the invention consists in the devices, combinations and arrangements of parts hereinafter described in connection with the accompanying drawings which illustrate a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the accompanying drawings, Fig. 1 is a front elevation, partly in section, of a feed-off-arm sewing machine embodying the invention. Fig. 2 is an end elevation of a portion of the machine looking from the left in Fig. 1, with the work-supporting arm in longitudinal section. Fig. 3 represents a vertical section of the machine bracket-arm substantially on the line 3—3 of Fig. 1. Fig. 4 represents a horizontal section of the machine bracket-arm substantially on the line 4—4 of Fig. 3. Fig. 5 represents a disassembled perspective of the locking detent and its supporting bushing, employed in connection with the adjustment of the needle-feed actuating eccentric.

The drawings illustrate the present improvement as embodied in the feed-off-arm sewing machine shown and described in my prior U. S. Patent No. 1,999,978, April 30, 1935, and, in part, in my prior patent application Serial No. 737,002, filed July 26, 1934. The sewing machine shown in the drawings has a frame comprising a bed having a forwardly extending arm 1 which carries a laterally extending hollow arm 2 which, in turn, carries a rearwardly extending hollow work-supporting arm 3. The arms 1, 2 and 3 are cast integral and are substantially coplanar or at the same level, thereby forming a U-shaped bed. Rising from the rearward portion of the arm 1 is the hollow standard 4 of a bracket-arm 5 terminating at its free end in a head 6 which overhangs the free end of the work supporting arm 3.

Journaled in ball-bearings 7 and 8 in the bracket-arm 5 is the main shaft 9 carrying at one end a driving-belt pulley 10 and at its opposite end a counterbalanced crank-disk 11. The crank-disk 11 is connected by the usual link 12 to a needle-bar 13 journaled for endwise reciprocation in suitable bearings provided in a swinging frame 14. The frame 14 is pivotally hung at its upper end upon a fulcrum-pin 15 secured in the bracket-arm head 6 and disposed substantially parallel to the axis of rotation of the main shaft 9. At its lower end, the needle-bar 13 is provided with one or more thread-carrying needles 16.

Suitably secured upon the main shaft 9 is a peripherally grooved pulley 17 connected by a clip belt 18 with a similar pulley 19 carried by a rotary actuating shaft 20. The shaft 20 is journaled in ball-bearings 21 in the carrier-arm 2 and is disposed substantially parallel to the main shaft 9, said shafts rotating in one-to-one relationship. As disclosed in greater detail in my prior patent application Serial No. 737,002, the shaft 20 carries a pair of bevel-gears 22 and 23 connected to driving mechanisms for rotary loop-takers disposed within the work-arm 3 at the free end thereof and which loop-takers cooperate with the needles 16 in the formation of stitches.

The work is advanced longitudinally of the work-arm 3 and off the free end thereof by a drop-feed mechanism including a feed-dog 25 which operates through a suitably slotted throat-

plate 26 secured upon the work-arm 3. The feed-dog is provided with needle-apertures 27 (only one of which is shown), said feed-dog being opposed by the usual presser-foot 28 provided with needle-slots 29 (only one of which is shown). The feed-dog 25 is carried by one end of a feed-bar 30 extending longitudinally of and within the work-arm 3, said feed-bar being suitably fulcrumed for rocking and endwise movements upon a bracket 31 within the work-arm.

In order to impart rocking movements to the feed-bar 30 and thereby rising and falling movements to the feed-dog 25, said feed-bar at its end opposite to the feed-dog is provided with a fork 32 engaging a block 33 embracing a feed-lift eccentric 34 suitably secured upon the rotary actuating shaft 20.

Secured, by screws 35, upon the feed-bar 30 for adjustment lengthwise thereof, is the carrier-arm of a fork 36 engaging a block 37 embracing a feed-advance eccentric 38, the fork 36 extending transversely of the feed-lift fork 32. The feed-advance eccentric 38 is secured upon the shaft 20 for adjustment of the eccentricity of the eccentric, the present arrangement corresponding substantially with the disclosure in the U. S. Patent to A. Grieb, No. 1,605,937, Nov. 9, 1926.

In order to provide for conveniently adjusting the eccentricity of the eccentric 38, the cover-plate 39 of the work-arm 3 is provided with a detent 40 manually operable to enter a stop-notch 41 provided in the periphery of an eccentric adjusting member 42 associated with the eccentric 38. When the detent 40 is depressed to enter the stop-notch 41, the adjusting member 42 is restrained against rotation, thereby to effect adjustment of the eccentric 38 by a turning movement of the shaft 20, all as fully disclosed in my prior patent application Serial No. 737,002.

Operatively engaging the swinging frame 14, in which the needle-bar is journaled, is a bent crank-arm 43 carried by one end of a horizontally disposed rock-shaft 44 journaled in the bracket-arm 5 below and substantially parallel to the main-shaft 9. Suitably secured upon the rock-shaft 44 is a forked member 45 engaging a block 46 embracing a needle-feed actuating eccentric 47. The actuating eccentric 47 embraces an eccentric 48 of an adjusting member mounted upon the main-shaft 9 for turning movement thereupon.

The actuating eccentric 47 has a flange 49 provided with a radial slot 50 slidingly entered by a pivot-block 51 carried by a shouldered anchor-pin 52. The anchor-pin 52 is fixed in a driving disk 53 secured by a screw 54 upon the main-shaft 9 for rotation therewith. Consequently, the anchor-pin 52 constitutes a driving connection compelling rotation of the actuating eccentric 47 with the shaft 9. The anchor-pin 52 extends loosely through an arcuate slot 55 provided in a flange 56 of the adjusting eccentric 48, the flange 56 being disposed between the flange 49 of the actuating eccentric 47 and the driving disk 53.

The adjusting member, associated with the eccentric 47 and comprising the eccentric 48 and its flange 56, is secured to the driving disk 53 for rotation therewith during the normal operation of the machine, but in a manner permitting relative rotation of said adjusting member and supporting disk for purposes of adjustment of the eccentricity of the eccentric 47. To that end, the side face of the adjusting-member flange 56 which is adjacent to the eccentric flange 49, is provided with a circular groove 57 affording a clearance recess for a friction plate 58 and the heads of screws 59 which pass freely through the arcuate slot 55 in the flange 56, the screws 59 being threaded into the driving disk 53. Friction washers 60 are interposed between the friction-plate 58 and the heads of the screws 59 to normally secure the adjusting member for rotation with the actuating eccentric. The flange 56 of the adjusting member 48 is peripherally provided with a stop-notch 61 adapted to receive a detent which is manually operable to hold the adjusting member against rotation with the eccentric 47.

The detent referred to comprises a horizontally disposed plunger-rod 62 having a reduced end 63 proportioned to enter the stop-notch 61, said plunger-rod being mounted for turning and endwise sliding movements in a bushing 64 fixed in a suitable opening in the front wall of the bracket-arm 5. Secured upon the outer end of the plunger-rod 62, by a set-screw 65, is a peripherally knurled head 66 of a bearing sleeve 67 slidably entering an annular socket 68 in the bushing 64. Interposed between the bottom of said socket 68 and the inner end of the bearing-sleeve 67 is a coil-spring 69 embracing the plunger-rod. Carried by the reduced inner end of the plunger-rod is a keeper-plate 70 adapted to enter a diametral groove 71 in the inner end face of the bushing 64. During the operation of the sewing machine, the keeper-plate 70 is held seated in the bushing-groove 71 by the spring 69.

It will be understood from the foregoing description that, in the operation of the machine, the needle-feed eccentric 47 actuates the rock-shaft 44 to vibrate the needle-bar frame 14, thereby imparting to the needles 16 lateral movements lengthwise of the work-arm 3, said needles deriving endwise reciprocations from the main-shaft 9 in the usual manner. The lateral movements of the needles 16 in the direction of the work-advancing movements of the feed-dog 25 occur while the needles are in the work. The needles pin the several work-plies against relative movement and assist in the feeding of said plies.

The needle-feed eccentric 47 and the feed-dog actuating eccentric 38 are so constructed and arranged that, in corresponding adjustments thereof, unison work-feeding movements are imparted to the feed-elements actuated thereby. To that end, said eccentrics and the adjusting means therefor are preferably of similar construction, but it is to be understood that the present invention is not limited to the specific form of construction of the eccentrics as hereinbefore described.

In order to concomitantly effect adjustment of the amplitude of work-feeding movement of the feeding elements, the plunger-rod 62 is pushed inwardly against the action of the spring 69, until the reduced end 63 of said plunger-rod enters the stop-notch 61 of the eccentric-adjusting member, and the keeper-plate 70 is free of the bushing-groove 71. The plunger-rod is now partly rotated so that the keeper-plate 70 engages the inner end face of the bushing 64, thereby holding the plunger-rod against retraction in response to the action of the spring 69. The detent 40 upon the work-arm is now depressed to enter the stop-notch 41 of the adjusting member 42 of the feed-dog actuating eccentric 38, said detent being held depressed while the main-shaft 9 is turned the angular degree to effect the desired adjustments of the eccentrics 38 and 47. As the shafts 9 and 20 are connected to rotate in one-to-one relation-

ship, it will be understood that said eccentrics are simultaneously adjusted to a corresponding extent, thereby accurately maintaining the unison feeding movements of the needles 16 and the feed-dog 25.

To facilitate accurate adjustment of the eccentrics 38 and 47, the extent of adjustment is visibly indicated, preferably by suitable graduations 72 upon the periphery of the driving disk 53 which is secured for rotation with the main-shaft 9. The periphery of the adjusting-member flange 56, adjacent to the driving disk 53, may be provided with a suitable index or line-mark (not shown) to indicate the extent of relative movement between the disk 53 and said flange 56 during adjustment of the eccentrics. The extent of adjustment may be observed by swinging out the usual cover-plate 73 upon the top of the bracket-arm 5, or a suitable observation-aperture may be provided in the front side of the bracket-arm, if preferred.

Having thus set forth the nature of the invention, what I claim herein is:—

1. Feeding mechanism for sewing machines including a plurality of feeding elements, adjustable eccentrics having operative connections with the respective feeding elements, and means for concomitantly effecting adjustments of the eccentricities of said eccentrics.

2. Feeding mechanism for sewing machines including feeding elements engageable with the work from opposite sides thereof, adjustable eccentrics having operative connections with the respective feeding elements, and means for concomitantly effecting adjustments of the eccentricities of said eccentrics.

3. Feeding mechanism for sewing machines including a work-advancing feed-dog and a reciprocatory thread-carrying needle having lateral work-feeding movements, an adjustable eccentric operatively connected to impart work-advancing movements to said feed-dog, an adjustable eccentric operatively connected to impart work-feeding movements to said needle, and means for concomitantly effecting adjustments of the eccentricities of said eccentrics.

4. A sewing machine having a frame comprising a bed and an overhanging bracket-arm, a thread-carrying needle, a rotary shaft journaled in said bracket-arm, a needle-feed actuating eccentric adjustably carried by said bracket-arm shaft, a rock-shaft journaled in said bracket-arm deriving operative movements from said needle-feed-actuating eccentric and connected to impart work-advancing movements to said needle, a feed-dog, a rotary shaft journaled in said bed, and a feed-eccentric adjustably carried by the bed-shaft and connected to impart work-advancing movements to said feed-dog.

5. A sewing machine having a frame comprising a bed and an overhanging bracket-arm, a thread-carrying needle, a rotary shaft journaled in said bracket-arm, a needle-feed actuating eccentric adjustably carried by the bracket-arm shaft and connected to impart work-advancing movements to said needle, a feed-dog, a rotary shaft journaled in said bed, a feed-eccentric adjustably carried by the bed shaft and connected to impart work-advancing movements to said feed-dog, and means providing for concomitantly adjusting the eccentricities of said eccentrics.

6. A sewing machine having a frame comprising a bed and an overhanging bracket-arm, a thread-carrying needle, a rotary shaft journaled in said bracket-arm, a needle-feed actuating eccentric adjustably carried by said bracket-arm shaft and connected to impart work-advancing movements to said needle, a feed-dog, a rotary shaft journaled in said bed, driving connections between said shafts, a feed-eccentric adjustably carried by the bed shaft and connected to impart work-advancing movements to said feed-dog, eccentric-adjusting members associated with said eccentrics, manually operable means mounted upon said bracket-arm for controlling the effective action of the adjusting member associated with the needle-feed actuating eccentric, and manually operable means mounted upon said bed for controlling the effective action of the adjusting member associated with the feed-dog actuating eccentric.

7. Feeding mechanism for sewing machines including a plurality of feeding elements, adjustable eccentrics having operative connections with the respective feeding elements, means for rotating said eccentrics, adjusting members associated with the respective eccentrics for effecting adjustments of the eccentricities of said eccentrics, manually operable detents engageable with the respective adjusting members for controlling the effective action of the adjusting members, and means providing for releasably latching one of said detents in adjusting-member engaging position.

8. A sewing machine having a frame including a bed and an overhanging bracket-arm, a rotary shaft journaled in said bed, a rotary shaft journaled in said bracket-arm, driving connections between said shafts, actuating eccentrics adjustably carried by said shafts, a plurality of work-advancing feeding elements deriving operative movements from the respective eccentrics, adjusting members associated with the respective eccentrics for effecting adjustments of the eccentricities of said eccentrics, a manually operable detent mounted upon said bracket-arm and engageable with an eccentric-adjusting member for controlling the effective action thereof, a manually operable detent mounted upon said bed and engageable with the other eccentric-adjusting member for controlling the effective action thereof, and means providing for releasably latching one of said detents in adjusting-member engaging position.

9. A sewing machine having a frame comprising a bed and an overhanging bracket-arm, a thread-carrying needle, a rotary shaft journaled in said bracket-arm, a needle-feed actuating eccentric adjustably carried by the bracket-arm shaft and connected to impart work-advancing movements to said needle, a feed-dog, a rotary shaft journaled in said bed, driving connections between said shafts, a feed-dog actuating eccentric adjustably carried by the bed shaft and connected to impart work-advancing movements to said feed-dog, eccentric-adjusting members associated with the respective eccentrics, a manually operable detent mounted upon said bracket-arm and engageable with the adjusting member associated with said needle-feed actuating eccentric, a manually operable detent mounted upon said bed and engageable with the adjusting member associated with said feed-dog actuating eccentric, and means providing for releasably latching one of said detents in adjusting-member engaging position.

10. A feed-off-arm sewing machine having a frame comprising a bed including a hollow work-arm free at one end, and a bracket-arm overhanging the free end of said work-arm, a needle-

carrying bar journaled in said bracket-arm, actuating mechanism for endwise reciprocating said needle-bar, actuating mechanism for imparting lateral work-feeding movements to said needle-bar lengthwise of said work-arm, a feed-dog having operative movements for advancing work lengthwise of said work-arm in unison with the work-feeding movements of said needle, and actuating mechanism for said feed-dog disposed within said work-arm.

11. A feed-off-arm sewing machine having a frame comprising a bed including a hollow work-arm free at one end, and a bracket-arm overhanging the free end of said work-arm, a needle-carrying bar journaled in said bracket-arm, actuating mechanism for endwise reciprocating said needle-bar, actuating mechanism for imparting lateral work-feeding movements to said needle-bar lengthwise of said work-arm, a feed-dog having operative movements for advancing work lengthwise of said work-arm in unison with the work-feeding movements of said needle, actuating mechanism for said feed-dog disposed within said work-arm, and means providing for concomitantly adjusting the amplitude of work-advancing movements of said feed-dog and needle to an equal extent.

12. A feed-off-arm sewing machine having a frame comprising a bed including a hollow work-arm free at one end, and a bracket-arm overhanging the free end of said work-arm, rotary shafts journaled in said bracket-arm and bed, driving connections between said shafts, an endwise reciprocatory and laterally vibratory needle-carrying bar, a needle-feed actuating eccentric adjustably carried by the bracket-arm shaft, connections with said eccentric for imparting lateral work-feeding movements to said needle lengthwise of said work-arm, an eccentric-adjusting member associated with said eccentric, a feed-dog operating at the free end of said work-arm, a feed-dog actuating eccentric adjustably carried by the bed shaft, connections with said feed-dog actuating eccentric for imparting work-advancing movements to said feed-dog in unison with the work-feeding movements of said needle, an eccentric-adjusting member associated with said feed-dog actuating eccentric, a manually operable detent mounted upon said bracket-arm and engageable with the adjusting member associated with the needle-feed actuating eccentric, a manually operable detent mounted upon said bed and engageable with the adjusting member associated with the feed-dog actuating eccentric, and means providing for releasably latching one of said detents in adjusting-member engaging position.

13. In a sewing machine having a work-support and a bracket-arm overhanging said work-support, a rotary actuating shaft journaled in said bracket-arm, a rotary feed-shaft journaled below said work-support, driving connections between said shafts, a feed-actuating eccentric adjustably carried by said feed-shaft, a feed-dog deriving operative movements from said eccentric, manually controllable means associated with said eccentric and rendered effective by a turning movement of said feed-shaft for adjusting the amplitude of work-advancing movement of said feed-dog, and means carried by the bracket-arm shaft for visibly indicating variations in the amplitude of feed.

14. In a sewing machine having a work-support and a bracket-arm overhanging said work-support, a rotary actuating shaft journaled in said bracket-arm, a rotary feed-shaft journaled below said work-support, driving connections between said shafts, a feed-actuating eccentric adjustably carried by said feed-shaft, a feeding-element deriving operative movements from said eccentric, an eccentric-adjusting member mounted upon said feed-shaft for normal rotation therewith, manually operable means for restraining said adjusting member against turning with said eccentric, thereby to adjust the amplitude of work-advancing movement of said feeding-element, and means carried by the bracket-arm shaft for visibly indicating variations in the amplitude of feed.

15. A feed-off-arm sewing machine having a frame comprising a bed including a hollow work-arm free at one end, and a bracket-arm overhanging the free end of said work-arm, rotary shafts journaled in said bracket-arm and bed, driving connections between said shafts, a feed-dog operating at the free end of said work-arm, a feed-dog actuating eccentric adjustably carried by the bed shaft, connections with said eccentric for imparting work-advancing movements to said feed-dog lengthwise of said work-arm, an eccentric-adjusting member normally rotatable with said eccentric, a manually operable detent mounted upon said bed for restraining rotation of the adjusting member with said eccentric, and a graduated disk carried by the bracket-arm shaft for visibly indicating variations in the amplitude of feed.

16. A sewing machine having actuating mechanism including a plurality of adjustable actuating eccentrics, and means including driving connections between said eccentrics providing for concomitantly and individually effecting adjustments of the eccentricities of said eccentrics.

17. A sewing machine having actuating mechanism including a plurality of connected rotary shafts, adjustable eccentrics carried by the respective shafts, and means including driving connections between said shafts for concomitantly effecting adjustments of the eccentricities of said eccentrics.

18. A sewing machine having a frame comprising a bed and an overhanging bracket-arm, substantially parallel rotary shafts journaled in said bracket-arm and bed, adjustable actuating eccentrics carried by the respective shafts, and means including one-to-one driving connections between said shafts for simultaneously adjusting said eccentrics as to eccentricity.

19. A sewing machine having actuating mechanism including a plurality of adjustable actuating eccentrics, adjusting members associated with the respective eccentrics for effecting adjustments of the eccentricities of said eccentrics, and manually operable means for concomitantly and individually controlling the effective action of said adjusting members.

20. A sewing machine having actuating mechanism including a pair of adjustable actuating eccentrics, and means for concomitantly effecting adjustment of the eccentricity of said eccentrics, said means providing for individually adjusting one of said eccentrics.

WALTER MYERS.