

E. A. MEALING.
SEWING MACHINE.
APPLICATION FILED JULY 21, 1908.

1,012,211.

Patented Dec. 19, 1911.

3 SHEETS—SHEET 1.

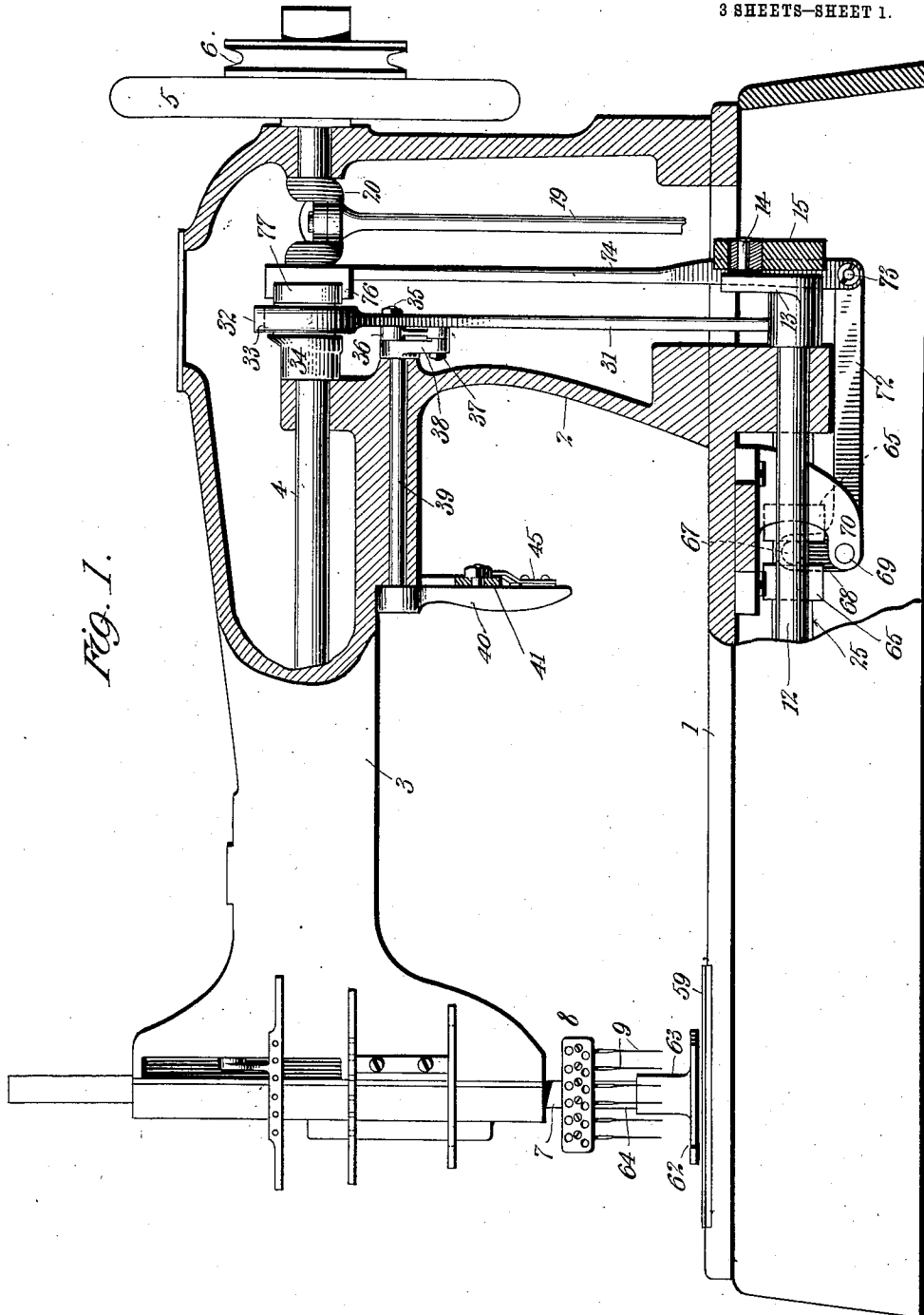


Fig. 1.

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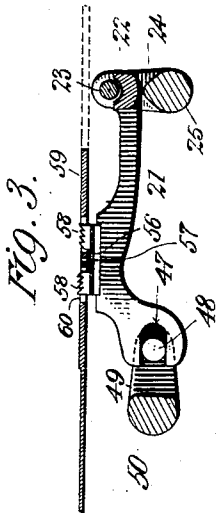
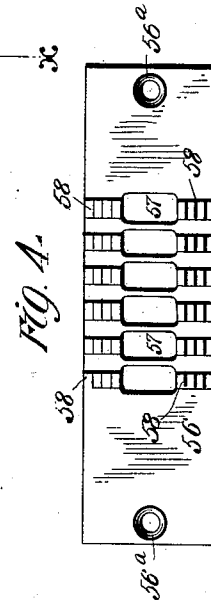
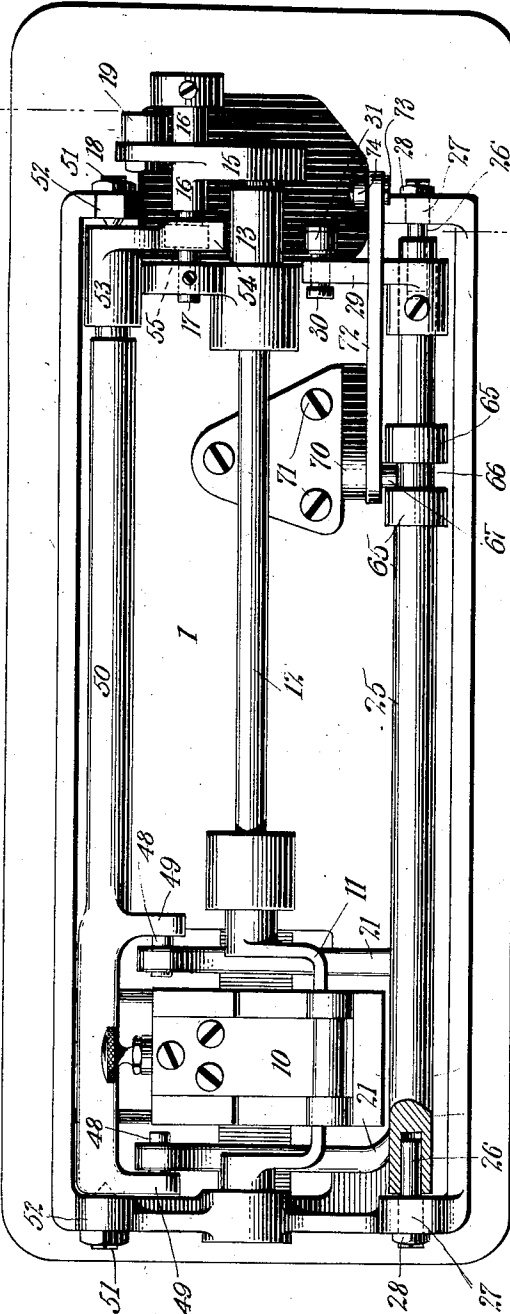


Fig. 2.



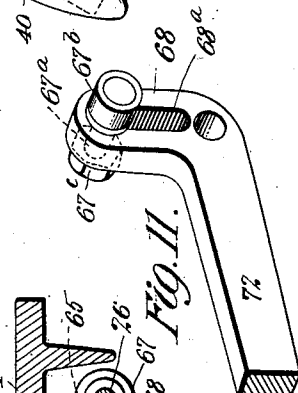
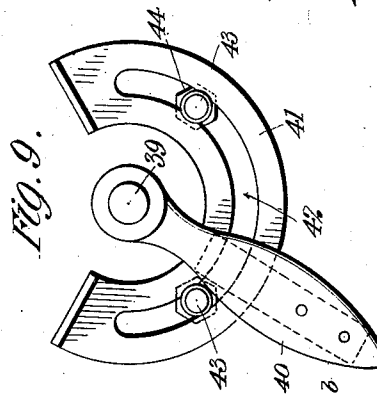
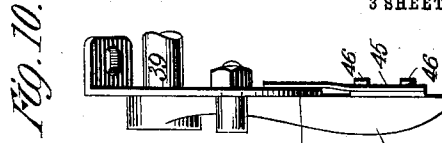
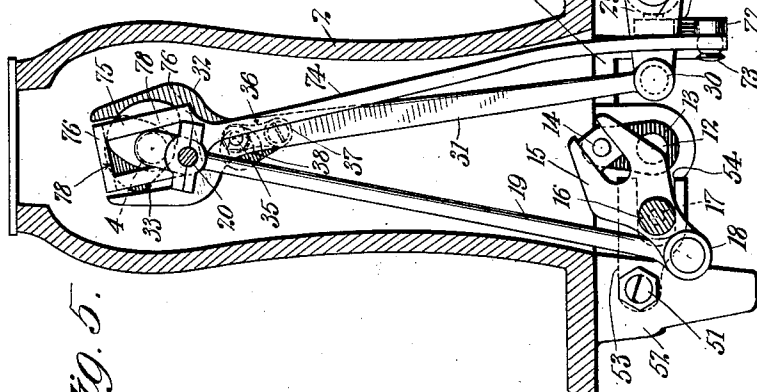
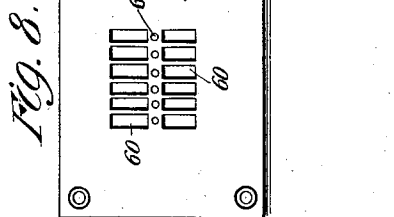
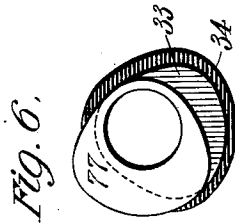
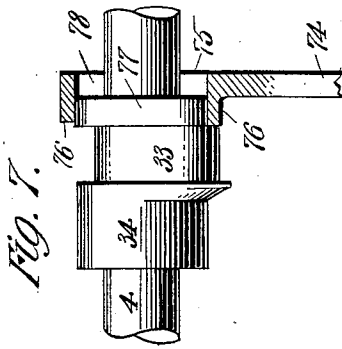
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1,012,211.

Patented Dec. 19, 1911.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ERNEST ALFRED MEALING, OF SOUTHVILLE, BRISTOL, ENGLAND, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

1,012,211.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed July 21, 1908. Serial No. 444,625.

To all whom it may concern:

Be it known that I, ERNEST ALFRED MEALING, a subject of the King of the United Kingdom of Great Britain and Ireland, residing at Southville, Bristol, England, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in oblique feed sewing machines designed more particularly for quilting, and it has for its object to provide a simple and effective mechanism whereby the work may be fed to the multiple needle stitch-forming mechanism at different angles so as to produce series of cross seams common to quilting operations.

The invention consists in the construction and arrangement of parts herein shown and described and set forth in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of a sewing machine embodying the present improvements, Fig. 2 is a bottom plan of the same, Fig. 3 a sectional elevation of the feed-bar and the rocking members from which it derives its forward and backward and its rising and falling movements. Fig. 4 is a plan of the feed-dog. Fig. 5 is a vertical transverse section through the upright portion of the bracket-arm, looking forwardly. Fig. 6 is an end view of the feed-actuating cams, and Fig. 7 a side view of a portion of the main-shaft carrying said cams, with the yoked upper end portion of one of the feed-actuating members embracing its respective cam. Fig. 8 is a plan of the throat-plate. Figs. 9 and 10 are detached face and side views of the feed-regulating lever and the adjacent segmental guide therefor. Fig. 11 is a perspective view of a modification of one of the members for producing the sidewise movement of the feed-dog.

The present improvement is shown embodied in a multiple needle sewing machine of the well-known Singer type, as represented in the United States patent to Philip Diehl No. 538,664, dated May 7, 1895.

The machine frame is shown constructed with the usual bed-plate 1 and bracket-arm comprising the upright portion 2 and overhanging portion 3 in which is journaled the

main-shaft 4 provided with the balance-wheel 5 and grooved belt-wheel 6. The forward end of the main-shaft is connected in the usual manner with the reciprocating needle-bar 7 carrying the multiple needle-clamp 8 in which are secured the thread-carrying needles 9 in a row parallel with the main-shaft. Coöperating with the several needles 9 is a corresponding number of shuttles mounted within the multiple shuttle-race-block 10 and deriving their oscillating movements from a driver 11 fixed to the forward end of the shuttle-actuating rock-shaft 12 having upon its rearward end the crank 13 carrying a roller-stud 14 entering a slide-block embraced by the forked arm 15 of a rocker having a hub 16 journaled upon the bearing pin 17 and having a second arm 18 pivotally connected with the lower end of a pitman 19 whose upper end embraces a crank 20 in the main-shaft 4.

The feed-bar is constructed with a pair of spaced parallel members 21 connected together at their rearward ends by a cross member 22 pivotally connected by means of a pin 23 with the spaced upwardly extending arms 24 of the feed rock-shaft 25 journaled to both slide and oscillate upon the bearing pins 26 the threaded shanks of which are tapped into ears 27 depending from the bed-plate and locked from turning by means of the nuts 28. Near its rearward end, the feed rock-shaft 25 is provided with a lateral crank-arm 29 to which is pivotally connected by means of the pin 30 the lower end of a link-bar 31 whose upper end is formed with a yoke 32 adapted to embrace the feed-actuating cam 33 whose hub 34 is secured to the main-shaft in the usual manner. The link-bar 31 is fulcrumed near its yoke 32 upon a movable fulcrum-pin 35 embraced and supported by the upper end of a swinging link 36 whose other end is itself fulcrumed upon the stud-pin 37 carried by a crank-arm 38 mounted upon the rearward end of the feed-regulator shaft 39 journaled in the bracket-arm beneath the main-shaft and carrying at its forward end the feed regulating hand-lever 40, which is disposed adjacent the guiding segment 41 attached to the bracket-arm and provided with a segmental slot 42 in which are adjustably secured the shouldered stop-studs 43 with clamp-nuts 44, these studs lying in the path

of movement of the lever 40 and being designed to limit the range of motion of the latter. The lever 40 carries a spring plate 45 secured thereto by means of fastening screws 46 and adapted to exert a yielding pressure upon the guide segment 41 in conjunction with the adjacent face of the lever 40 to impose sufficient friction for preventing the displacement of the lever in the normal operation of the machine.

The opposite ends of the members 21 of the feed-bar from the pivotal pin 23 are provided with lateral slots 47 entered by roller studs 48 carried by the spaced lateral arms 49 of the feed-lifting rock-shaft 50 which is mounted upon the bearing center screws 51 tapped into ears 52 depending from the bed-plate and provided at its reduced rearward end with a lateral crank-arm 53 forked at 54 to embrace a suitable actuating cam 55 upon the hub 16 of the shuttle actuating rocker, whereby the feed-lifting rock-shaft 50 is oscillated and rising and falling movements are imparted to the feed-bar.

Within suitable notches or seats in the feed-bar 21 are secured the opposite ends of the feed-dog plate 56 provided with a series of spaced needle openings 57 and with oppositely disposed rows of teeth or serrations 58 each disposed in line with one of said needle openings, the serrations upon opposite sides of the needle openings being reversely disposed to enable the feed-dog to take a firm hold of the work in either the forward or backward operative movement of the same. The throat-plate 59 is formed with a series of feed-apertures 60 corresponding in number and arrangement with the feed surfaces 58 of the feed-dog, and of sufficient size to permit the oblique movement of the feed-dog; and needle-holes 61 are arranged therein correspondingly with the positioning and spacing of the needles. Opposed to the throat-plate 59 and feeding surfaces 58 of the feed-dog is the usual presser-foot 62 whose shank 63 is secured to the usual presser-bar 64.

The feed rock-shaft 25 is provided with spaced shoulders, herein shown as afforded by the adjacent edges of the fixed collars 65, the intermediate groove 66 thus formed being entered by a roller-stud 67 carried by the upwardly extending shorter arm 68 of an angular lever fulcrumed by means of a pin 69 upon a bracket 70 secured by means of fastening screws 71 to the bottom of the bed-plate, the other arm 72 of such rock-lever being pivotally connected by means of the pin 73 with the lower end of a link-bar 74 whose upper end is provided with a yoke-plate 75 having the transversely disposed ribs 76 embracing the cam 77 attached to the cam 33 upon the main-shaft 4. The yoke-plate 75 is formed with a longitudinal slot

78 embracing the main-shaft and adapted to retain the yoke in operative relation with its cam.

It will be observed that the rising and falling movements of the link-bar 74 derived from each rotation of its actuating cam 77 fixed upon the main-shaft, will impart to the feed rock-shaft, and hence to the feed-dog rigidly connected therewith, through the rock-lever 68 72, a to-and-fro movement longitudinally of the machine and transversely of the primary or advance feed movement of the feed-dog, this lateral movement being in the present machine uniform for all adjustments and reversals of movement of the primary feed-actuating mechanism, although it is evident that provision may be made for adjustment of the side movements of the feed-dog by usual means, as represented in Fig. 11, wherein the rock lever arm 68 is provided with a radial slot 68^a entered by the shouldered stud-pin 67^a carrying the roller 67^b and adapted to be adjusted therein toward and from the fulcrum-pin 69 by merely loosening and re-tightening the clamp-nut 67^c applied to the end of the stud-pin 67^a.

In the employment of the present machine for quilting, the stop-studs 43 are designed to be set in such position that when the lever 40 is shifted into contact with either, the fulcrum carrying arm 38 will be thrown at corresponding distances from its central or neutral position, but it is evident that the adjustment of the advance feed mechanism may be effected to any desired degree intermediate the extreme positions corresponding with the limits of throw of the lever 40, whereby the resultant direction of feed produced by the independently operating feed actuating devices will be changed to any desired angle, the stitch length being, of course, changed proportionately. In case it should be desired to produce a multiple seam in the line of the needles, it is evident that the machine can be adjusted therefor by bringing the lever 40 to intermediate or neutral position with the crank-arm 38 in nearly vertical arrangement, whereby the primary feed-cam 33 would operate to vibrate the link-bar 31 idly upon its swinging fulcrum 35 without producing any material rising and falling movement of the connected crank-arm 29.

From the foregoing description it will be obvious that in the operation of the machine for ordinary quilting work, the stop-studs 43 having been set at equal distances from neutral position, and the hand-lever 40 having been thrown into contact with the one to produce a forward feed movement, the machine will produce a resultant forward and side-wise motion to the right in the production of a continuous succession of straight-away stitches, thus stitching a series of parallel seams corresponding in number and spacing

with the needles. When the work has progressed sufficiently far in this direction, the hand-lever 40 is thrown backwardly into extreme position in contact with the other stop-stud, which causes the reversal of the primary feed-actuating mechanism, thus producing a retrograde movement of the work relative to the primary direction of feed for production of a continuous succession of retrograde operative movements of the primary feed-actuating mechanism and a simultaneous sidewise feed to the left, whereby the second series of seams are caused to cross diagonally the first series of seams. The succeeding reversal of feed by actuation of the hand-lever 40 effects a second advance movement of the feed in the production of a series of seams parallel with the first series but spaced therefrom a distance depending upon the feed adjustment and length of initial seam. These several cross seams may obviously be produced not only without removing the work from the machine, but without severing the threads at the end of each seam. As indicated in the drawings, the single-throw primary and secondary feed-actuating cams 33 and 77 are both of the well-known "triangular" form, and they are so related that their simultaneous action upon the feed-bar 21, through the yoked cam-rods 31 and 74 and the transversely fulcrumed rocking members 24, 25, 29 and 68, 72, is to impart a resultant work-advancing movement in directions diagonal to the main-shaft 4 and to the row of needles 9, whereby parallel lines of straight-away stitching are produced in directions diagonal in relation to the bed-plate.

While in the present embodiment of the improvement provision is made for reciprocating the feed rock-shaft in order to communicate the sidewise movements to the feed-dog, it is evidently immaterial whether the connection between the bell-crank or angle-lever 68 72 be with the feed-shaft or directly with the feed-dog plate 56 when mounted to slide transversely of the feed-bar members 21 by the elongation of the holes 56^a for its fastening screws or by other well-known means. It will also be understood that the present invention is not limited to the specific construction and arrangement of parts herein shown and described whereby oblique feeding movements are imparted to the feed-dog, as others will readily suggest themselves as adapted to effectively embody the principles of construction involved in the mechanisms set forth in the appended claims.

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

1. In a sewing machine, the combination with the frame comprising a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, and two feed-cams and a feed-lift actuating member fixed upon

said main-shaft, of feeding mechanism comprising parallel feed-lifting and feed-actuating rock-shafts journaled beneath the bed-plate, a feed-bar, a feed-dog mounted thereon, an upwardly extending arm upon the feed-actuating rock-shaft and a lateral arm upon the feed-lifting rock-shaft by which said feed-bar is supported at different portions of its length, an operative connection between one of said feed-cams and the feed-actuating rock-shaft for imparting rocking movements to the latter, an operative connection intermediate the feed-lift actuating member and the feed-lifting rock-shaft for imparting rocking movements to the latter, a rock-lever, a fulcrum therefor beneath the bed-plate and arranged transversely to the feed-actuating rock-shaft, an operative connection between said rock-shaft and a second of the feed-cams upon the main-shaft, and an operative connection between the feed-bar and said rock-lever for communicating lateral movements to the feed-dog.

2. In a sewing machine, the combination with a rotary shaft, of feeding mechanism comprising a feed-dog, primary actuating mechanism for imparting thereto advance or primary feeding movements and including a cam upon the main-shaft, a link-bar having a yoke embracing said cam and an operative connection with said feed-dog, a regulator rock-shaft, a crank-arm fixed thereon, a swinging link pivotally supported by said crank-arm and carrying a fulcrum for said link-bar, means for communicating rising and falling movements to said feed-dog, means for imparting to said feed-dog operative movements transversely of said primary feeding movements, a lever fixed upon said feed-regulating rock-shaft and adjustable stops for limiting the range of movement of said lever whereby the length and direction of the feeding movements is controlled.

3. In a sewing machine, the combination with the main-shaft and two single-throw actuating feed-cams mounted thereon, of a feed-bar, a feed-dog mounted thereon, means for imparting rising and falling movements to said feed-bar, and means for imparting work-advancing movements to the feed-dog through said feed-bar, and including rocking members one of which is arranged and adapted to act upon the feed-dog through the other member, said rocking members being connected with said feed-bar and having fulcrums arranged transversely to each other, and cam-rods pivotally connected to said rocking members and each provided with a yoke embracing one of said actuating cams.

4. In a sewing machine, the combination with the main-shaft, of feeding mechanism comprising a feed-dog, primary actuating mechanism including a cam upon the main-shaft and connections between the same and the feed-dog whereby a continuous succes-

sion of work-advancing or primary feeding movements may be imparted to said feed-dog, means for imparting to the feed-dog rising and falling movements, means including a second cam upon the main-shaft for imparting to the feed-dog operative movements simultaneously with and transversely to the primary feeding movements, and a feed-reversing device connected with the primary feed-actuating mechanism and controlling the same to change the direction of primary feeding movements for production of a continuous succession of retrograde feeding movements independently of the transverse feeding movements.

5. In a sewing machine, the combination with the frame comprising a bed-plate and an overhanging bracket-arm, a rotary main-shaft, and stitch-forming mechanism, of feeding mechanism comprising a reciprocatory feed rock-shaft journaled beneath the bed-plate, means including cams fixed upon the main-shaft for imparting rocking and reciprocating movements to said rock-shaft, a feed-bar pivotally connected at one end with and partaking of the reciprocatory movements of the feed rock-shaft, a feed-dog fixed upon said feed-bar, a feed-lifting rock-shaft also mounted beneath the bed-plate parallel with the feed rock-shaft, and a pivotal and sliding connection between the feed-lifting rock-shaft and the feed-bar affording a support for the opposite end portion of the feed-bar and adapted to impart rising and falling movements to the latter.

6. In a sewing machine, the combination with the frame comprising a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, and two feed-cams fixed thereon, of feeding mechanism comprising a feed-bar disposed beneath the

bed-plate, a feed-dog carried by said feed-bar, primary actuating mechanism connected with one of the actuating cams upon the main-shaft for imparting to the feed-dog through the feed-bar advance or primary feeding movements, means for communicating rising and falling movements to said feed-dog, means for imparting to said feed-dog uniform operative movements transversely of said primary feeding movements and including a rock-lever having an arm connected with said feed-dog and a second arm, and a cam-rod having a yoke embracing the other actuating cam upon the main-shaft and pivotally connected with the second-arm of said rock-lever.

7. In a sewing machine, the combination with the frame comprising a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, two feed-actuating members fixed upon the main-shaft, and stitch-forming mechanism including a reciprocating needle journaled in said bracket-arm and operatively connected with the main-shaft, of feeding mechanism comprising a feed-bar disposed beneath the bed-plate, a feed-dog carried by said feed-bar, operative connections between said feed-actuating members and the feed-dog for imparting thereto work-shifting movements in directions respectively transversely and longitudinally of the main-shaft, and means for communicating rising and falling movements to the feed-dog.

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

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Witnesses:

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