April 25, 1933. W. N. PARKES 1,906,087

NEEDLE THREAD TAKE-UP MECHANISM FOR SEWING MACHINES

Filed Jan. 26, 1932 2 Sheets-Sheet 1

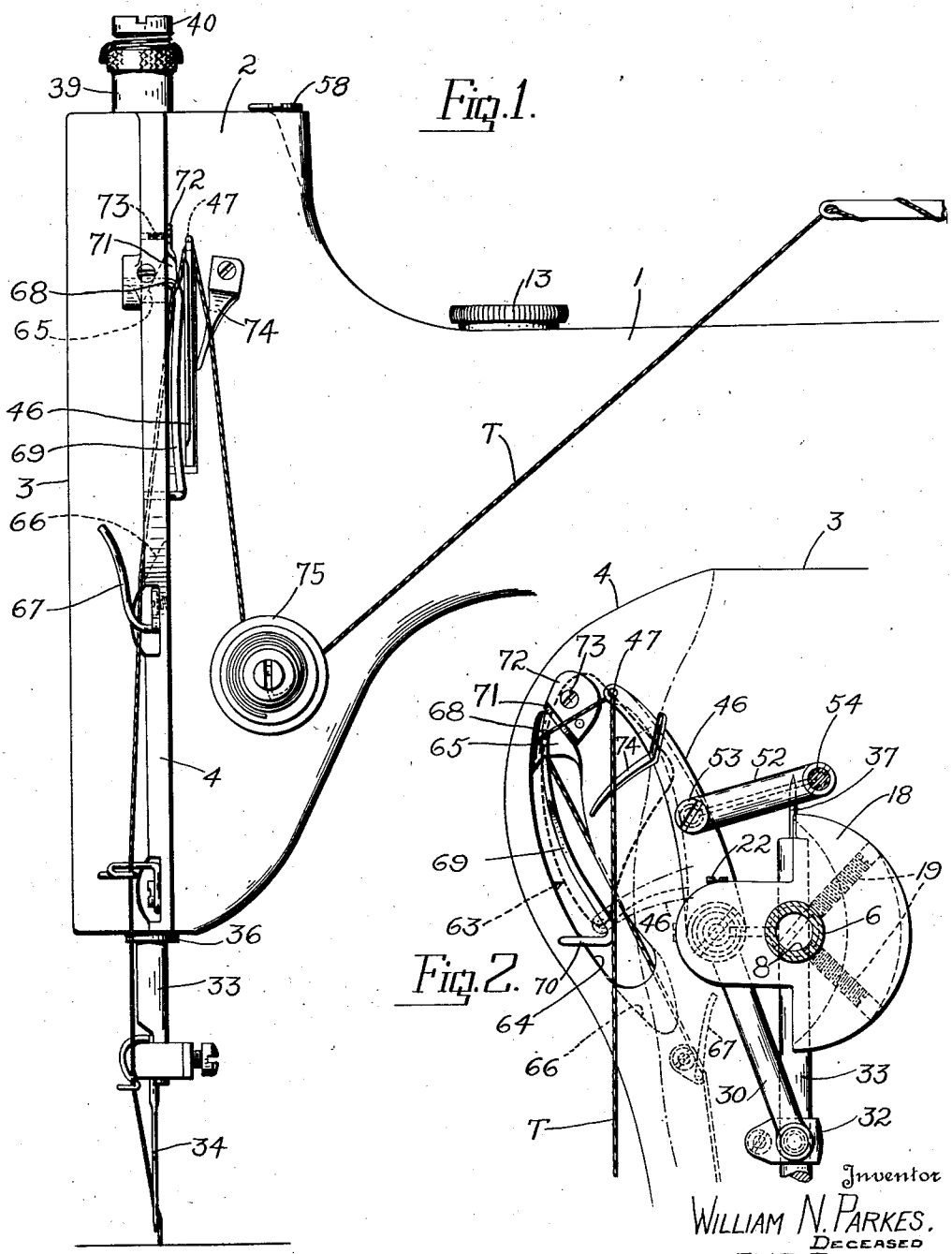


Fig. 1.

Fig. 2.

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Filed Jan. 26, 1932 2 Sheets-Sheet 2

Fig. 3.

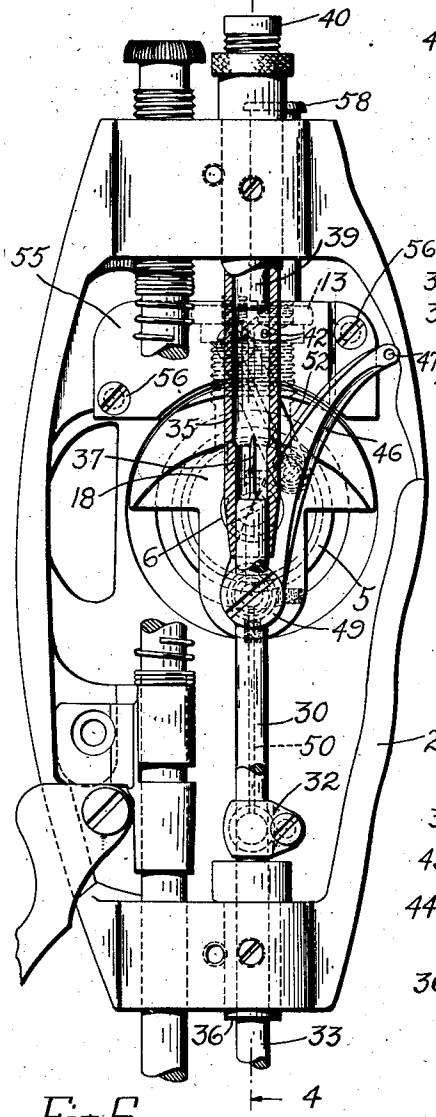


Fig. 4.

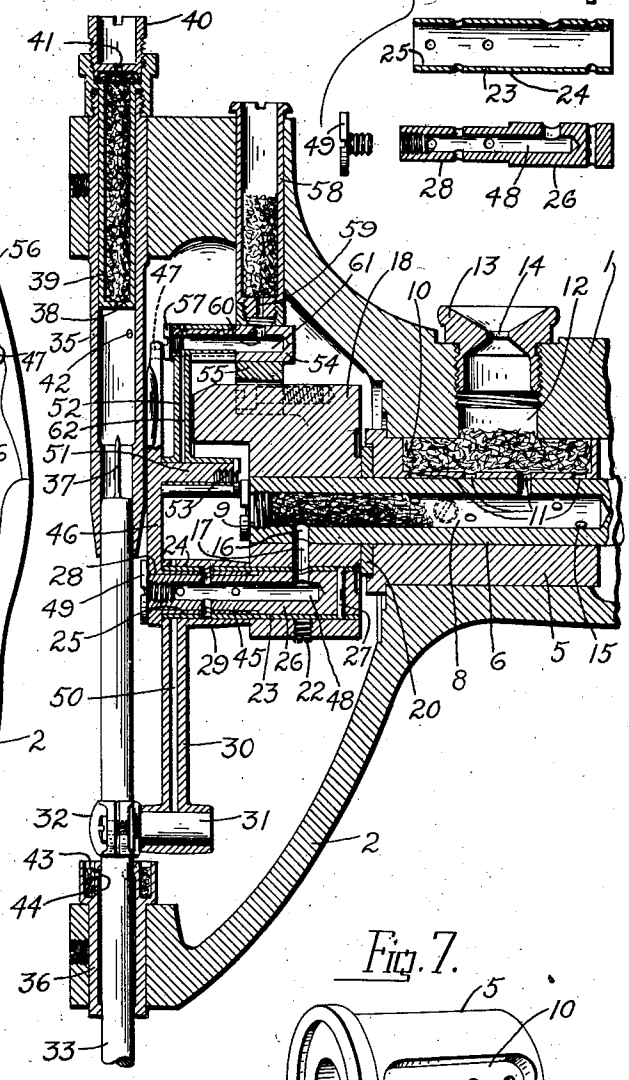


Fig. 5.

Fig. 7.

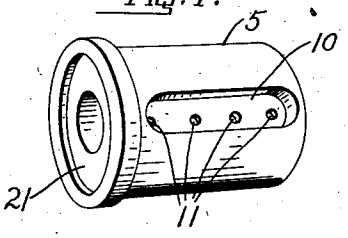
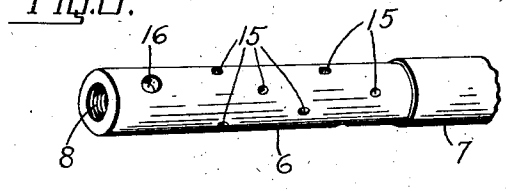


Fig. 6.



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UNITED STATES PATENT OFFICE

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NEEDLE-THREAD TAKE-UP MECHANISM FOR SEWING MACHINES

Application filed January 26, 1932. Serial No. 588,894.

This invention relates to improvements in needle-thread take-up mechanisms for sewing machines, and has for an object to provide improved actuating means for the needle-thread engaging take-up member, whereby said mechanism is better adapted for operation at high speeds.

Another object of this invention is to provide improved means for reciprocating the needle-bar and the take-up member of a sewing machine.

The present invention has also for an object to provide improved thread-guiding and controlling devices coacting with the take-up in more efficiently handling the needle-thread.

The foregoing and other objects and advantages in view, together with means whereby the same may be carried into effect, will best be understood from the following description of a preferred embodiment thereof illustrated in the accompanying drawings, in which:

Fig. 1 is a view in front side elevation of the head end of the bracket-arm of a sewing machine having embodied therein the improvements constituting the present invention. Fig. 2 is a side elevation, partly in section, of the take-up and thread-controlling elements, together with a portion of the face-plate as viewed from the right in Fig. 1. Fig. 3 is a front end view of the bracket-arm head, with its face-plate removed. Fig. 4 is a vertical section of the bracket-arm head substantially on the line 4—4 of Fig. 3. Fig. 5 comprises detail sectional views of the elements constituting a preferred embodiment of the crank-pin employed for actuating the needle-bar and needle-thread take-up. Fig. 6 is a perspective view of the crank-carrying tubular end of a rotary shaft journaled in the machine bracket-arm, and Fig. 7 is a perspective view of a bearing bushing for said shaft.

The sewing machine illustrated in the accompanying drawings has a frame including a tubular bracket-arm 1, terminating at its free end in a head 2. Removably secured upon the end of the head 2 is a face-plate 3, and in the present case integral with said face-plate is a vertically disposed flange 4 extending forwardly from the bracket-arm in a direction transverse to the length of said bracket-arm.

Suitably fixed within the bracket-arm 1 is a bearing bushing 5 in which is journaled the reduced portion 6 of a rotary actuating shaft 7, provided longitudinally of its reduced end with a wicking-containing bore 8 into the open end of which is threaded a bore-sealing screw 9. Formed in the upper side of the bushing 5 is a wicking-containing pocket 10 provided in its bottom with a plurality of apertures 11 connecting said pocket with the shaft-bearing surface of the bushing 5. Opening into the bushing pocket 10 is an orifice 12 formed in the upper side of the bracket-arm 1, said orifice being threaded to receive a cap-screw 13 provided in its head with a countersunk lubricant-introducing aperture 14. The reduced portion 6 of the shaft 7 is provided with a plurality of radial apertures, as 15, adapted to receive lubricant passing through the bushing apertures 11, said shaft apertures being preferably disposed spirally along the length of the shaft portion 6 to more efficiently distribute the lubricant to the shaft-bearing surface. The shaft apertures 15 also serve to conduct lubricant into the wicking filled shaft-bore 8, from which it is free to pass through an aperture 16 into an alined aperture 17 formed in a crank-member 18, secured by screws 19 upon the end of the shaft-portion 6. A washer 20 is interposed between the inner face of the crank-member 18 and the bushing 5, of which the face adjacent to said crank-member is preferably provided with a washer-receiving annular recess 21.

Fixed in said crank-member by set-screws 22 is a crank-pin device projecting from said crank-member in a direction substantially parallel to the axis of the shaft 7. Said crank-pin device, as preferably constructed, comprises a bearing-sleeve 23 providing a cylindrical outer bearing-surface 24 and an inner bearing-surface 25, within which sleeve is secured a stud-pin 26 by means of a fastening pin 27. The stud-pin 26 is reduced at its free end to provide a cylindrical bearing-surface 28 spaced from the inner surface

25 of the bearing-sleeve and substantially parallel thereto. Instead of constructing the crank-pin device as described, it is obvious that it might be otherwise formed to provide radially spaced inner and outer bearing-surfaces, as 24, 25 and 28, for instance by providing a single crank-pin element with a suitable annular recess.

Journaled upon the bearing-surface 24 of the crank-pin device is an apertured boss 29 of a link 30 of which the bossed lower end is pivotally entered by a stud-pin 31 of a collar 32 suitably secured upon a needle-bar 33 carrying at its lower end a needle 34. The needle-bar 33 is journaled for endwise reciprocation in vertically alined bushings 35 and 36 suitably secured in the bracket-arm head 2, the upper end of said needle-bar carrying a pin 37 adapted to intermittently enter an aperture 38 in the lower end of a shell 39 of which the headed upper end is threaded upon the bushing 35. The shell 39 contains a lubricant-absorbent wicking, and threaded into the head end of said shell is a chambered cap-screw 40 having an aperture 41 through which lubricant may be supplied to the shell wicking. This construction provides for automatically lubricating the bearing-surface of the bushing 35 upon reciprocation of the needle-bar, any excess lubricant within said bushing being sprayed by the reciprocating needle-bar through a bushing aperture 42 and upon the take-up actuating mechanism later described. In order to lubricate the bearing-surface of the lower needle-bar bushing 36, the head end thereof is provided with an annular, wicking-filled recess 43 from which lubricant may pass through an aperture 44 to said bearing-surface.

Disposed between the bearing-surfaces 25 and 28 of the crank-pin device is an apertured boss 45 at one end of a take-up member 46 provided at its opposite end with thread-engaging means in the form of a thread-eye 47. While the boss 45 of said take-up member is in the present case primarily journaled upon the bearing-surface 28 of the crank-pin device, it is also in sliding contact with the bearing-surface 25. It is obvious however that the boss 45 may be journaled upon either of the bearing-surfaces 25, or 28 independently of the other, if so desired. The crank-pin stud 26 has a longitudinal bore 48 intersected by apertures alined with the aperture 17 of the crank-member 18, said bore 48 being closed at its outer end by a screw 49 which also serves to hold the take-up member 46 against movement endwise of the crank-pin device. The stud-pin 26, the take-up member boss 45 journaled thereupon, and also the bearing-sleeve 23 are all provided with apertures suitable for conducting lubricant from the stud-pin bore 48 to the bearing-surfaces of said crank-pin device, the described arrangement of the inner and outer bearing-surfaces of said crank-pin device thus lending itself to the ready lubrication of the bearing-surfaces, as well as providing journaling means of a substantial character for the needle-bar link and take-up member to efficiently withstand high speed operation of the sewing machine. The needle-bar link 30 is preferably also provided with a longitudinal bore 50 through which lubricant is conducted from the crank-pin device described to the bearing surface of the stud-pin 31.

Projecting toward the crank-member 18 from the take-up member 46 intermediate the ends of the latter is a fulcrum-stud 51 which, in the present instance, is integral with said member 46. Pivotally embracing the fulcrum-stud 51 is one of the laterally bossed ends of a link 52 held upon said fulcrum-stud by a screw 53. The other bossed end of the link 52 pivotally embraces the reduced end of an anchoring-pin 54 suitably fixed in a bracket 55 secured by screws 56 in the bracket-arm head 2. The link 52 is held against movement endwise of the anchoring-pin 54 by means of a screw 57 threaded into the end of said pin.

Threaded into the upper side of the bracket 55 is a lubricant-wicking containing tube 58 fitted into a vertical aperture in the head 2, said tube having an aperture 59 in its bottom for conducting lubricant from said tube through an aperture 60 in the anchoring-pin 54 into a bore 61 provided in said pin longitudinally thereof. The anchoring-pin 54 is additionally provided with a plurality of apertures for conducting lubricant to the bearing-surface of said pin and also through a bore 62 longitudinally of the link 52 to the bearing-surface of the fulcrum-stud 51. From the foregoing description it will be understood that the link 52 constitutes a floating pivotal support for the take-up member 46, the thread-eye of said member having a path of movement defining a field 63 which, as illustrated in dotted lines in Fig. 2 of the drawings, is adjacent and substantially parallel to the bracket-arm flange 4.

The flange 4 of the bracket-arm is provided with a generally vertically extending segmental-slot 64, the curvature of which in the present case corresponds substantially with the forward portion of the take-up field 63. As represented in Figs. 1 and 2 of the drawings, the upper and lower ends of the flange-slot 64 terminate, at opposite faces of the flange, in beveled surfaces 65 and 66, whereby the portion of the needle-thread T between the take-up eye 47 and the needle is free to extend in a straight line to a thread-guide 67 disposed directly below the slot 64 and at the side of the flange 4 opposite to the take-up side thereof.

Anchored in the flange 4 at the upper end

of the slot 64 is the offset upper end 68 of a needle-thread controlling element 69, which in the present instance is in the form of a bent wire disposed between the take-up field 63 and the flange 4, as well as contiguous to and within the laterally projected area of the slot 64. The lower end 70 of the thread-controlling element 69 is bent forwardly crosswise of the slot 64 and is anchored in the flange 4 adjacent to said slot, whereby the thread T passed over the controlling element 69 and through the slot 64 is confined between the ends of said element. The offset upper end 68 of the element 69 provides a shoulder first engaged by the thread T as the take-up member 46 approaches the upper end of its stroke. It will be observed from Fig. 2 of the drawings that the upward movement of the take-up eye 47 beyond the shoulder 68 is relatively short, curving rearwardly of the shoulder 68 very gradually during said upward movement to slowly complete drawing up of the needle-thread loop preparatory to setting the stitch, which occurs in substantially the position of the take-up member 46 illustrated in Figs. 1 and 2 of the drawings. The take-up eye 47 moves only a very short distance away from the shoulder 68 from the upper end of the take-up path to stitch-setting position and the consequent relatively slow stitch-setting movement is therefore favorable to high speed operation of the machine.

A thread cast-off device is provided adjacent to the upper end of the thread-controlling element 69 to insure that the thread T is cast off the controlling element 69 at the take-up side thereof, when the take-up member 46 moves downwardly from stitch-setting position. This cast-off device, in the present instance, comprises a thread-engaging lip 71 bent laterally from its shank 72 which is secured by a screw 73 upon the flange 4, said lip 71 being so arranged as to initiate deflection of the thread in a direction away from the flange 4.

Secured upon the bracket-arm head 2 at the side of the take-up field opposite to the thread-controlling element 69 is a thread-detaining finger 74 over which the portion of the thread leading from a tension device 75 to the take-up eye 47 is looped by the take-up member 46, said finger 74 serving to temporarily detain the thread during the downward movement of said member 46. The free end of the finger 74 is inclined downwardly and also laterally toward the take-up field, it being understood that said finger imposes no material resistance to the withdrawal of the thread therefrom by the action of the loop-taker employed for cooperation with the needle in the formation of stitches.

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

1. In a sewing machine, a rotary shaft, a reciprocatory needle-bar, a needle-bar reciprocating link, a thread take-up member, and a tubular crank-pin carried by said rotary shaft provided exteriorly and interiorly of the crank-pin with bearings for said link and take-up member.

2. In a sewing machine, a rotary shaft, a reciprocatory needle-bar, a needle-bar reciprocating link, a thread take-up member, and a crank-pin device carried by said rotary shaft providing pivotal bearings directly upon the crank-pin for said link and take-up member, said bearings being spaced apart radially from the longitudinal axis of said crank-pin.

3. In a sewing machine, a rotary shaft, a reciprocatory needle-bar, a needle-bar reciprocating link, a thread take-up member, a crank-pin carried by said shaft provided with relatively rigid outer and inner bearings radially spaced apart for receiving said link and take-up member, and controlling means determining the path of movement of said take-up member.

4. In a sewing machine, a rotary shaft, a reciprocatory needle-bar, a crank-pin carried by said shaft having an outer bearing surface and recessed longitudinally to provide bearing surfaces radially spaced apart within said crank-pin, and a needle-bar reciprocating link and a thread take-up member operatively journaled upon said crank-pin bearing surfaces.

5. In a sewing machine, a rotary shaft, a reciprocatory needle-bar, a crank-pin fixedly carried by said shaft having an outer cylindrical bearing-surface and provided interiorly thereof with a bearing surface spaced from the inner surface of the cylindrical crank-pin, and a needle-bar reciprocating link and a thread take-up member operatively journaled upon said crank-pin bearing surfaces.

6. In a sewing machine, a rotary shaft, a reciprocatory needle-bar, a crank-member carried by said shaft, a sleeve projecting from said crank-member, a stud-pin disposed within and providing a bearing surface spaced from said sleeve, a needle-bar reciprocating link journaled upon said sleeve, and a take-up member journaled upon said stud-pin.

7. In a sewing machine, a rotary shaft, a reciprocatory needle-bar, a crank-member carried by said shaft, a crank-pin device projecting from said crank-member providing an outer cylindrical bearing surface and recessed longitudinally from its free end to provide a cylindrical inner bearing surface, a needle-bar reciprocating link journaled upon one of said bearing surfaces of the crank-pin device, a take-up member journaled upon the other bearing surface thereof, and means confining said link and take-up member against movement endwise of said crank-pin device.

8. In a sewing machine, a rotary shaft, a reciprocatory needle-bar, a crank-member carried by said shaft, a crank-pin device projecting from said crank-member providing an outer cylindrical bearing-surface and recessed longitudinally to provide an inner bearing surface, said crank-pin device having a chamber within said inner bearing surface and being provided with apertures connecting said chamber with said bearing surfaces, a needle-bar reciprocating link journaled upon one of the bearing surfaces of said crank-pin device, and a take-up member journaled upon the other of said bearing surfaces.

9. In a sewing machine, a rotary shaft, a reciprocatory needle-bar, a crank-member carried by said shaft, a crank-pin device projecting from said crank-member providing an outer cylindrical bearing-surface and recessed longitudinally from its free end to provide an inner cylindrical bearing-surface substantially concentric with said outer bearing surface, said crank-pin device having a chamber within said inner bearing surface and being provided with apertures connecting said chamber with said bearing surfaces, a needle-bar reciprocating link pivotally journaled upon one of the bearing surfaces of said crank-pin device, a take-up member journaled upon the other bearing surface of said crank-pin device, and means at the free end of said crank-pin device confining one of the elements journaled upon said bearing surfaces against movement endwise of said crank-pin device.

10. In a sewing machine having a frame including a bracket-arm provided with a vertically disposed take-up guard-flange having a needle-thread receiving slot, a vertically reciprocatory needle, a take-up member provided with needle-thread engaging means from which the thread passes through said guard-flange slot to the needle, means for actuating said take-up member to impart to the thread-engaging means thereof a path of movement defining a field formed adjacent to said guard-flange, and a needle-thread controlling element disposed contiguous to and within the laterally projected area of said guard-flange slot at the take-up member side thereof, said element providing a shoulder in the path of the thread as the take-up member approaches stitch-setting position.

11. In a sewing machine having a frame including a bracket-arm provided with a vertically disposed take-up guard-flange having a needle-thread receiving slot, a vertically reciprocatory needle, a take-up member provided with needle-thread engaging means from which the thread passes through said guard-flange slot to the needle, means for actuating said take-up member to impart to the thread-engaging means thereof a path of movement defining a field formed adjacent to said guard-flange, and a needle-thread controlling element disposed contiguous to and within the laterally projected area of said guard-flange slot at the take-up member side thereof, said element having spaced thread engaging shoulders confining the thread therebetween and one of said shoulders being disposed to coact with said take-up member as the latter approaches stitch-setting position.

12. In a sewing machine, a vertically reciprocatory needle, a take-up member provided with needle-thread engaging means, means for supporting and actuating said take-up member to impart to the thread-engaging means thereof a path of movement defining a field, and a needle-thread controlling element disposed adjacent to said field at the needle side thereof providing vertically spaced thread-engaging shoulders confining the needle-thread therebetween, one of said shoulders being engaged by the thread as said take-up member approaches stitch-setting position.

13. In a sewing machine, a vertically reciprocatory needle, a take-up member provided with needle-thread engaging means, means for supporting and actuating said take-up member to impart to the thread-engaging means thereof a path of movement defining a field, a needle-thread controlling element providing a shoulder coacting with said take-up member in the setting of stitches, and a cast-off device projecting into the path of the thread-portion carried beyond said shoulder by the take-up member in the setting of the stitches.

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

JEREMIAH V. B. PARKES.

Administrator of the Estate of William Nelson Parkes, Deceased.