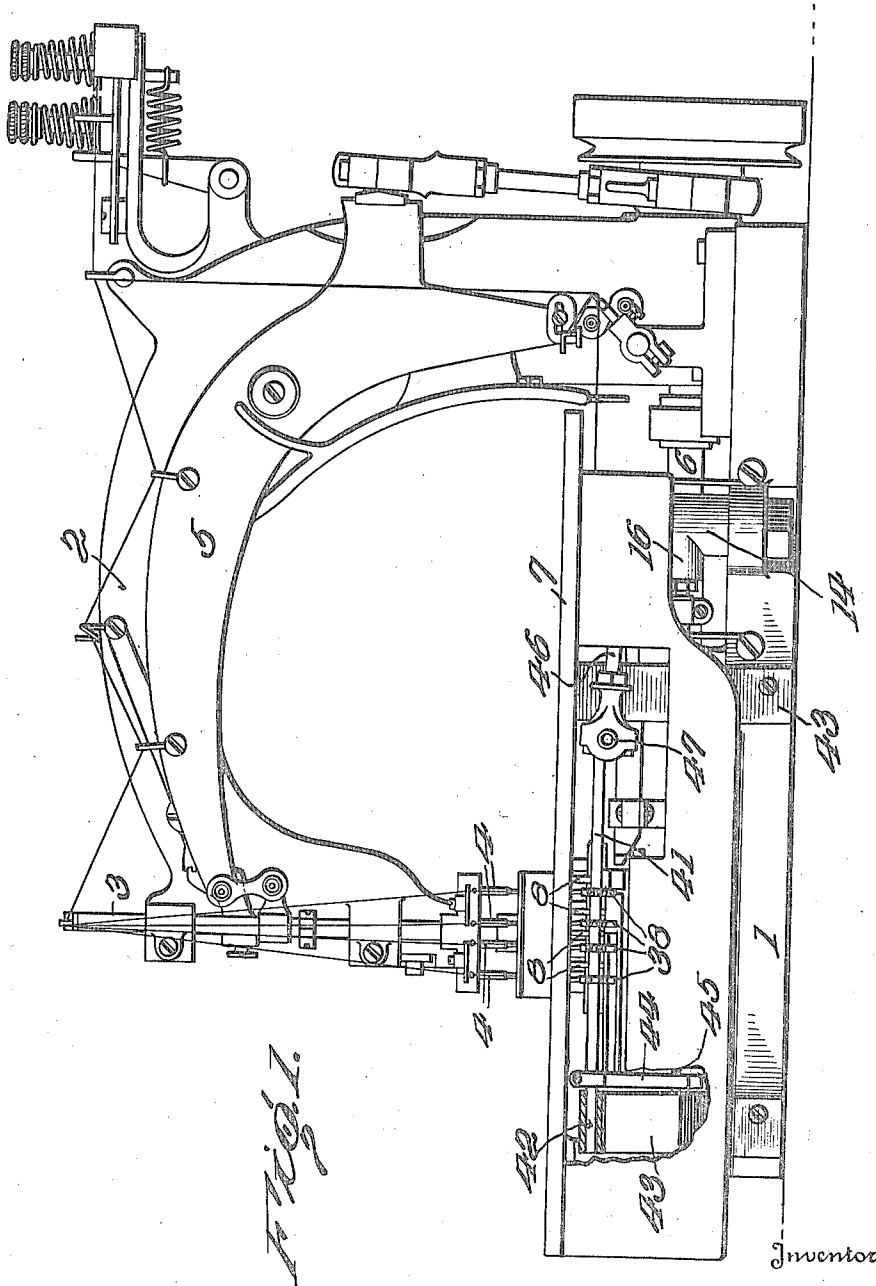


Jan. 23, 1923.

J. R. MOFFATT ET AL.  
MULTIPLE NEEDLE SEWING MACHINE.  
FILED OCT. 17, 1919.

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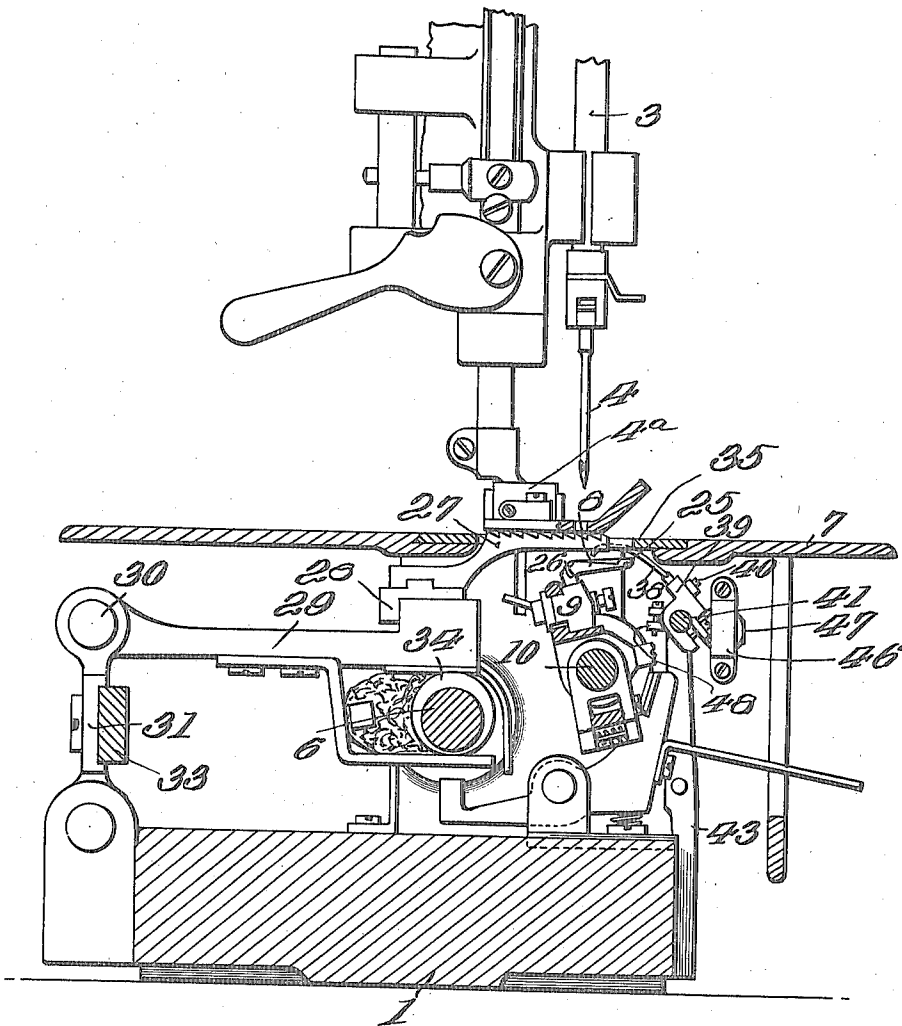
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*Fig. 2.*



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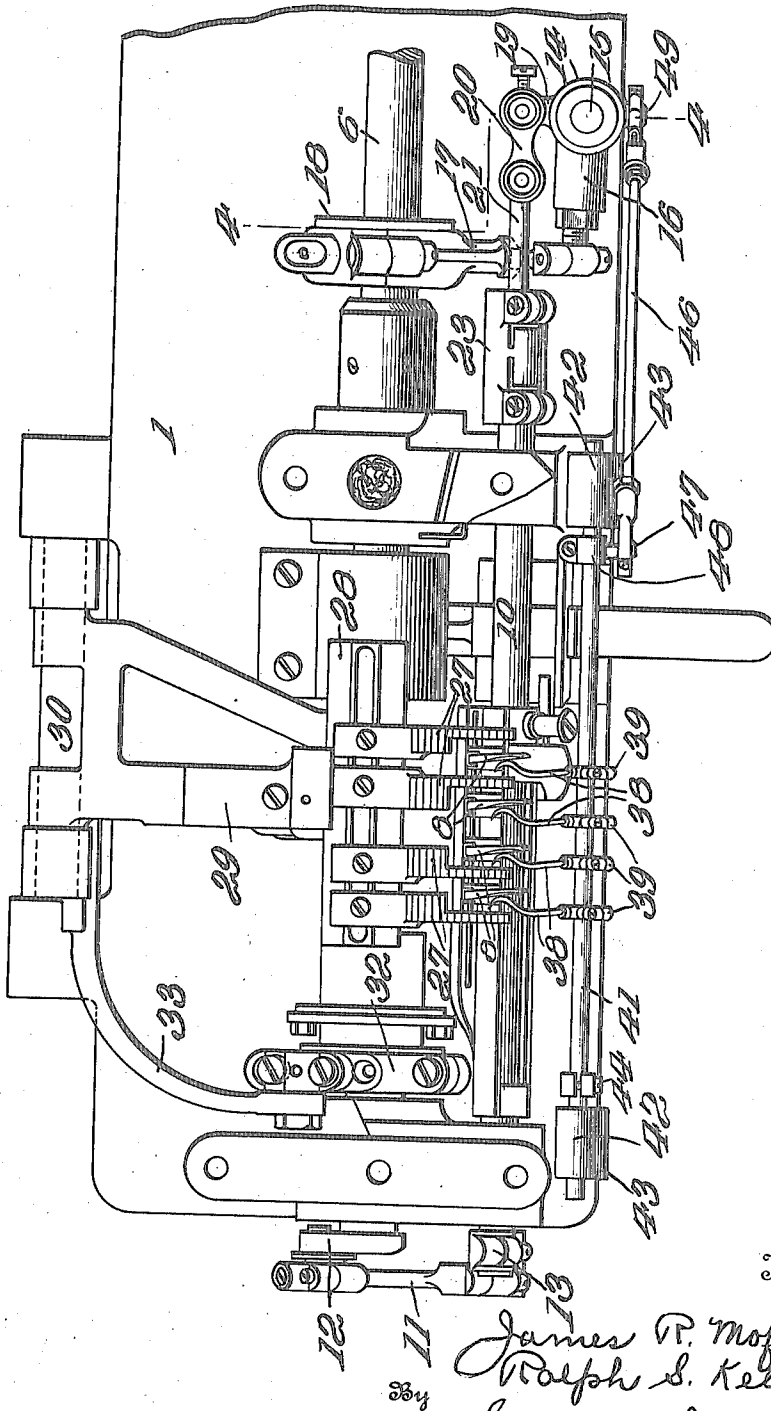
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7 SHEETS-SHEET 3

*Fig. 3.*



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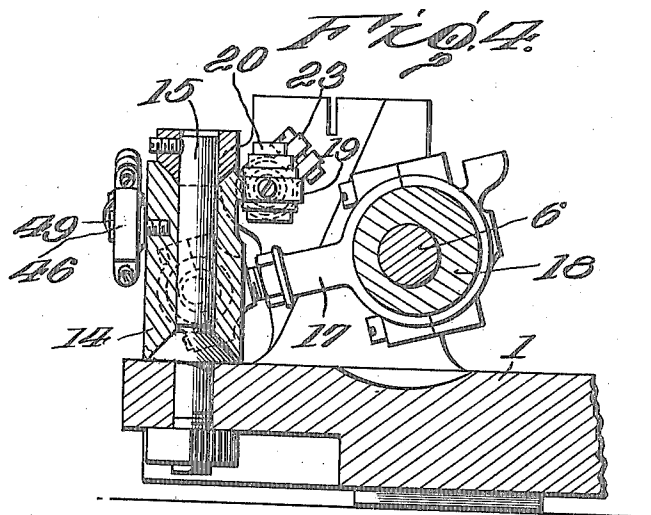
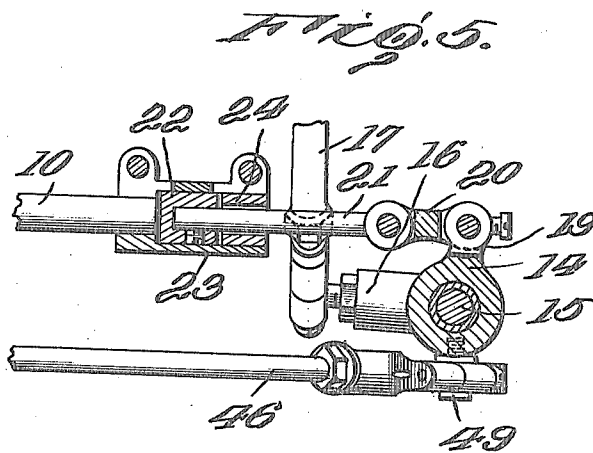
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7 SHEETS-SHEET 4



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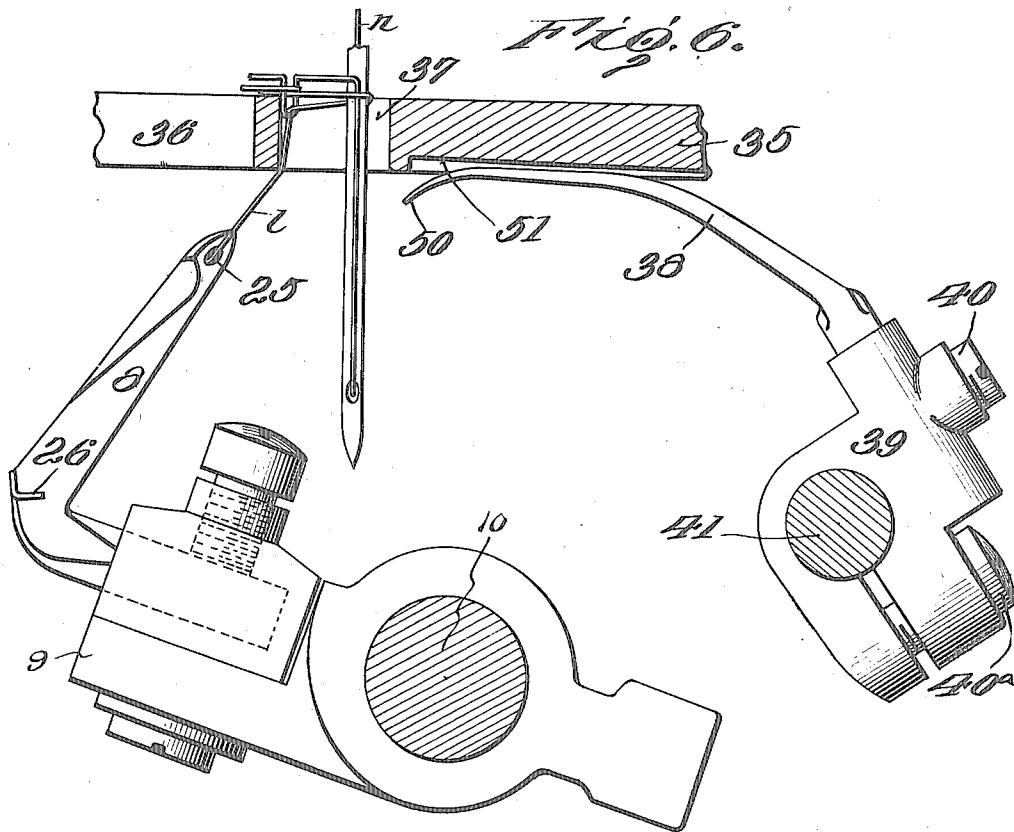
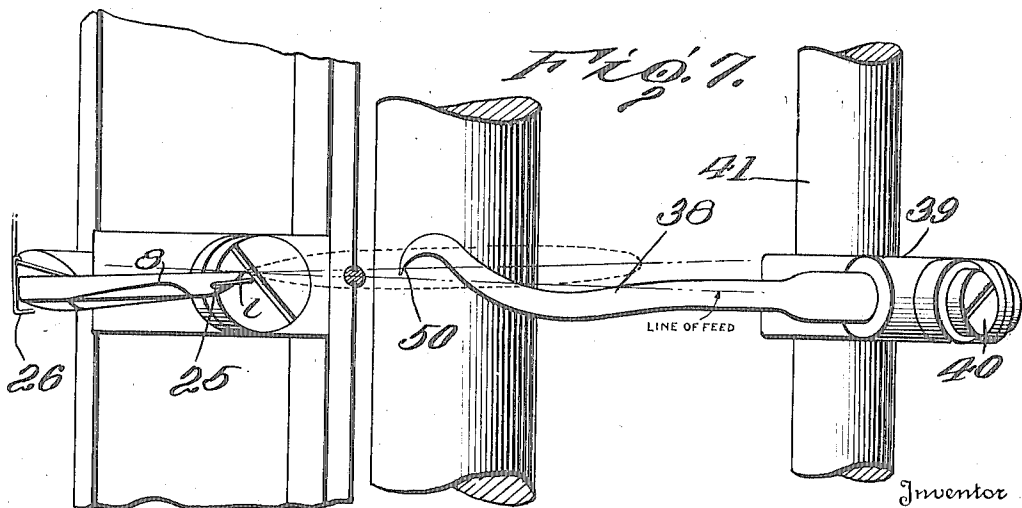
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7 SHEETS-SHEET 5



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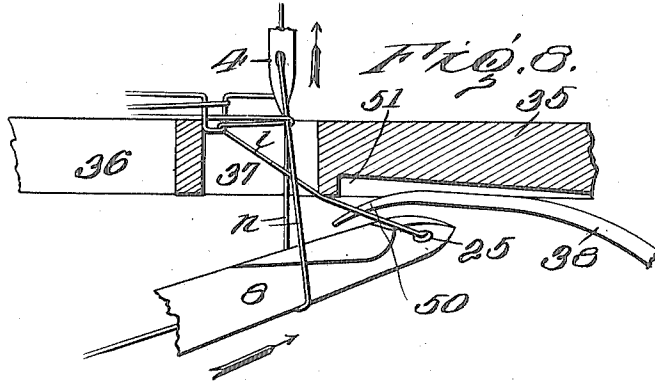
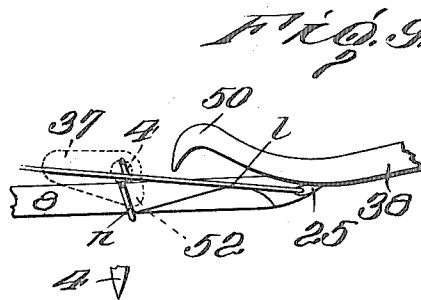
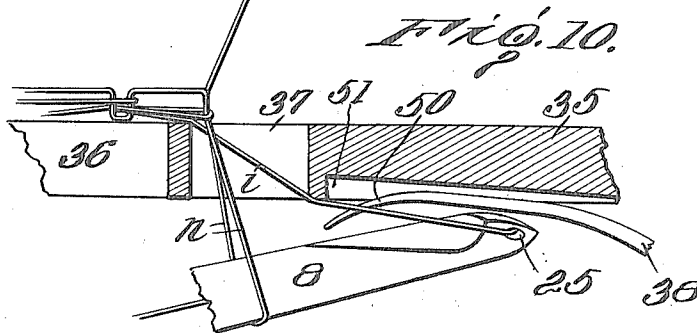
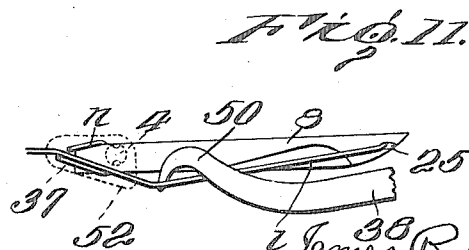
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Jan. 23, 1923.

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FILED OCT. 17, 1919.

7 SHEETS-SHEET 6



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7 SHEETS-SHEET 7

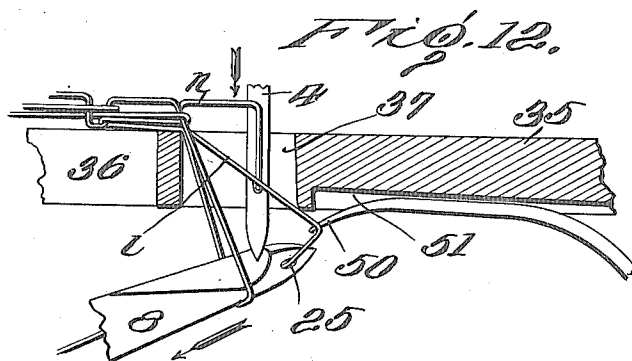
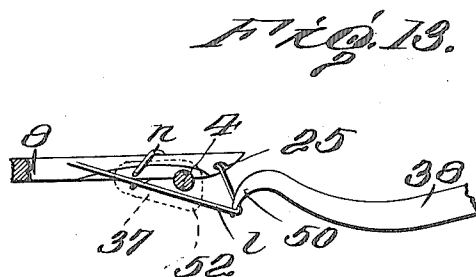


*Fig. 14.*

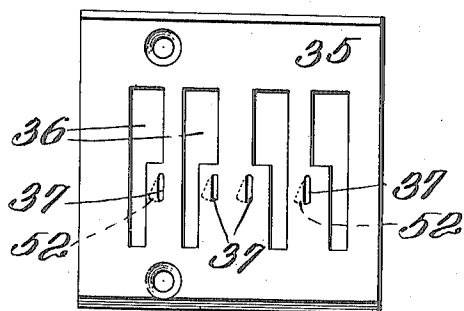
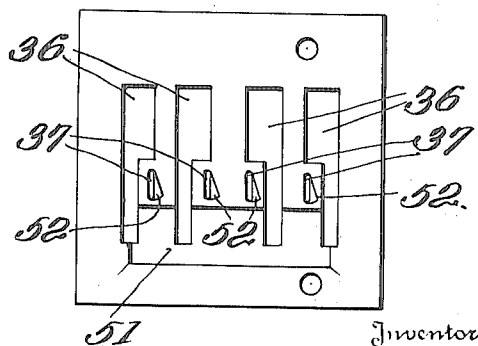


*Fig. 15.*



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## UNITED STATES PATENT OFFICE.

JAMES R. MOFFATT AND RALPH S. KELSO, OF CHICAGO, ILLINOIS, ASSIGNORS TO  
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OF ILLINOIS.

## MULTIPLE-NEEDLE SEWING MACHINE.

Application filed October 17, 1919. Serial No. 331,371.

*To all whom it may concern:*

Be it known that we, JAMES R. MOFFATT and RALPH S. KELSO, citizens of the United States, residing, respectively, at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Multiple-Needle Sewing Machines, of which the following is a description, reference being had to the accompanying drawing and to the figures of reference marked thereon.

The invention relates to new and useful improvements in multiple needle sewing machines, and more particularly to a sewing machine having a plurality of threaded loopers which move in the general direction of the line of feed and in a direction opposed to the feed when entering their respective needle thread loops.

An object of the invention is to provide a machine of the above character wherein a spreading finger is associated with each looper and operates to engage the looper thread for holding said looper thread away from the body of the looper to insure the point of the needle passing between the looper thread and the body of the looper, and wherein said spreading finger is moved back and forth only and in a direction substantially at right angles to the line of feed.

A further object of the invention is to provide a machine of the above character wherein the throat plate is cut away to give clearance for the spreading finger so that it and the looper may operate close to the under surface of the throat plate.

A still further object of the invention is to provide a sewing machine of the above character wherein the throat plate is formed with a recess on its under face adjacent the needle hole to give clearance for the looper thread to facilitate the swinging of the looper thread laterally by the spreading finger, also to permit the looper thread to be held well up relative to the throat plate without contacting therewith.

Another object of the invention is to provide a machine of the above character wherein the spreading fingers are disposed in lines substantially parallel with the line of feed, and wherein the movement of the spreading fingers is restricted so that each feed dog may be provided with a fabric engaging section extending in front of the needle with which it is associated.

Still another object of the invention is to provide a machine of the above type wherein each spreading finger may be adjusted in a vertical plane horizontally and endwise in order to position the same relative to the throat plate and the looper.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings, which show by way of illustration one embodiment of the invention:—

Figure 1 is a front view of a multiple needle sewing machine embodying the improvements, certain parts being broken away;

Fig. 2 is a transverse sectional view substantially on the line of feed showing certain of the parts beneath the work support in side elevation;

Fig. 3 is a top plan view of the parts beneath the work support;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a horizontal sectional view through a portion of the operating means for giving the loopers their needle avoiding movement and the spreading fingers their movement;

Fig. 6 is an enlarged detail section substantially on the line of feed showing the throat plate, one of the needles and the looper and spreading finger associated therewith;

Fig. 7 is a view showing in section the needle and in plan the looper support, one of the loopers, the support for the spreading fingers and one of the spreading fingers;

Fig. 8 is a view, partly in vertical section and partly in side elevation, showing the throat plate, one of the needles, the looper and spreading finger associated therewith, the looper being on its forward movement and positioning the looper thread relative to the spreading finger;

Fig. 9 is a top plan view of the looper and the spreading finger in the positions shown in Fig. 8, and showing in dotted lines the needle and the needle hole in the throat plate;

Fig. 10 is a view similar to Fig. 8, but showing the looper and spreading finger, the looper being at its extreme forward point and with the looper thread held to one side so that the needle on its down stroke

will pass between said looper thread and the body of the looper;

Fig. 11 is a view similar to Fig. 9, but showing the looper and spreading finger as positioned in Fig. 10.

Fig. 12 is a view similar to Fig. 8, but showing the needle point well by the looper thread and the spreading finger just about to release the looper thread;

Fig. 13 is a view similar to Fig. 10, but showing the looper and spreading finger positioned as in Fig. 12;

Fig. 14 is a top plan view of the throat plate; and

Fig. 15 is a bottom plan view of the same.

The sewing machine to which the invention has been applied is similar to that shown and described in the patent granted to us December 10, 1918, No. 1,287,392, and many of the features of the present machine are described and claimed therein. The present invention is directed particularly to an improvement in the means shown in said patent for positioning the looper thread to insure that the point of the needle will pass between the looper thread and the body of the looper which is associated with said needle.

In the present invention, this is accomplished by means of a spreading finger associated with each needle and operating to engage the looper thread and hold the same to one side and away from the body of the looper so as to insure that the point of the needle will pass between said looper thread and the body of the looper. This spreading finger is mounted and operates wholly in front of the needle. There is a spreading finger for each needle in a multiple needle machine. The spreading fingers are arranged in lines substantially parallel to the line of feed and are preferably carried by a single support which is moved so as to impart a back and forth lateral movement to the spreading fingers. The movement of the spreading fingers is preferably obtained from the means which move the loopers laterally, provided the invention is embodied in a machine wherein the loopers have a needle avoiding movement, and thus the spreading fingers are timed with the lateral movement of the loopers. The throat plate is cut away on the under face thereof adjacent the needle slot but in advance thereof so as to give ample clearance for the movement of the spreading fingers and thus permit the spreading fingers to be placed so as to move above the path of lateral movement of the loopers and without requiring the loopers to be lowered from their normal operating position relative to the throat plate. By arranging the spreading fingers in a line substantially parallel with the line of feed and by restricting their lateral movement, each feed dog may be provided with a fabric en-

gaging section disposed close to the needle and extending to points well in advance thereof and without interfering with said fingers.

The invention will possibly be better understood by reference in detail to the drawings, which show an embodiment of the invention. In Fig. 1 of the drawings, there is shown a multiple needle machine embodying the improvements which consists of a bed plate 1 having an overhanging arm 2 in which a needle bar 3 reciprocates, carrying, as herein shown, four needles which are indicated at 4—4. These needles are arranged in a vertical plane at right angles to the line of feed. The needle bar is reciprocated by a needle lever 5 which is operated from the main shaft 6 located between the work support 7 and the bed plate 1. Cooperating with each needle beneath the work support is a threaded looper 8. These threaded loopers are all disposed so as to lie in planes substantially parallel with the line of feed. The loopers, as shown in the drawings, move in a direction opposed to the direction of feed when entering the needle thread loops, and each looper is given a lateral or needle avoiding movement. It will be understood, however, that from certain aspects of the invention, the loopers may be moved back and forth without any lateral movement.

These loopers 8 are mounted on a looper carrier 9 which is supported by a shaft 10. The shaft 10 is mounted to oscillate and also to reciprocate endwise in suitable bearings carried by the base 1 of the machine. The looper shaft 10 is oscillated to cause the loopers to enter and withdraw from their respective needle thread loops by means of a link 11 which is connected to a crank 12 carried by the left hand end of the main shaft 6. Said link is connected also to an arm 13 which is fixed to the end of the shaft 10 so that the rotation of the shaft 6 through said link will cause the looper supporting shaft 10 to oscillate. Said looper supporting shaft 10 is moved endwise by means of a rocking sleeve 14 which is mounted to turn about a vertical pivot 15. Said rocking sleeve is provided with an arm 16 which carries an adjustable ball stud at its outer end. An eccentric strap 17 cooperating with an eccentric 18 on the main shaft 6 is connected to said ball stud and serves as a means for oscillating said sleeve 14. Said sleeve 14 is also provided with an arm 19 which is connected by means of a link 20 to a rod 21. The rod 21 has a collar 22 fixed to its free end, and this collar is secured to the shaft 10 by means of a split sleeve 23 which is clamped to a collar 24 and also to the end of the shaft. The rod 21 passes freely through the collar 24, and this connection serves as a means for moving the looper shaft 10 endwise, and also as a means

for permitting the oscillation of the looper shaft 10 by means of the link 11, above referred to.

Each looper 8 is provided with an eye 25 adjacent the point thereof, and also with an eye 26 at the heel of the looper. The looper thread passes through the eye 26 and then through the eye 25 at the point of the looper. The material is fed across the work support by means of feed dogs 27 which are mounted on a cross bar 28 carried by the feed bar 29. The feed bar 29 is pivoted at 30 to a feed rocker 31 which is oscillated by means of an eccentric strap 32 on the main shaft 6. Said eccentric strap is connected with an arm 33 formed integral with the looper rocker. The feed bar is raised and lowered by an eccentric 34 on the main shaft 6. A presser foot 4<sup>a</sup> holds the material on the work support.

The work support is provided with a throat plate 35 which is secured to the work support 7 in the usual way. Said throat plate is formed with feed slots 36 and also with needle slots 37. It will be noted that the feed slots extend from a point well in front of the needle slots, along side of the needle slots, and to a point well in rear of the needle slots. The feed dogs 27 are shaped to correspond with these feed slots and, therefore, the material will be engaged by these feed dogs at points in advance of and in rear of the needle slots, the positions of which are indicated in Figs. 14 and 15.

Associated with each looper 8 is a spreading finger 38. These spreading fingers 38 are each mounted in a carrier 39 and held therein by means of a set-screw 40. This connection between the carrier and the spreading finger permits of a limited endwise adjustment of the spreading finger. Each carrier 39 is in the form of a split collar and is provided with a clamping bolt 40<sup>a</sup> by which the collar is locked to the supporting shaft or rod 41 which carries the spreading fingers. By loosening the bolt 40<sup>a</sup>, the spreading fingers may be angularly adjusted about the shaft or rod 41 and thus the position of the spreading fingers relative to the under face of the throat plate may be varied. It will also be noted that the spreading fingers may be adjusted longitudinally in the carriers which support the same by loosening the set-screw 40. Then again, it will be noted that the carriers 39 may not only be adjusted angularly on the shaft but may slide longitudinally of the shaft. Through these three adjustments, the spreading fingers may be set so as to properly cooperate with their respective loopers.

The shaft or rod 41 is mounted in bearings 42 carried by brackets 43 secured to the base of the machine and projecting upwardly therefrom. Clamped to the shaft or

rod 41 is a depending arm 44 which has a free connection with a pin 45 carried by one of the brackets 43. This arm serves the purpose of preventing the shaft or rod 41 from oscillating in its bearings. The shaft or rod 41 is moved endwise in its bearings by a link 46 which is connected to a ball stud 47 carried by a collar 48 clamped to said shaft or rod 41. The other end of the link 46 is connected to a ball stud 49 threaded into the oscillating sleeve 14 so that, as said sleeve oscillates, it will not only move the loopers laterally for their needle avoiding movement but it will also impart a lateral movement to the spreading fingers, these movements being in opposite directions. By operating the loopers and spreading fingers from a common connection with the main shaft, we insure a proper timing between said fingers.

Each spreading finger is curved toward its outer end in a vertical plane, and the extreme end thereof, indicated at 50, moves in a lower plane than that portion of the spreading finger in rear of said extreme end. This extreme end 50 is hook shaped, as clearly shown in Fig. 7 of the drawings. The throat plate 35 is formed with a cut-away portion 51 which is located wholly in advance of the needle slots 37, and said cut-away portion forms a clearance space in which the spreading fingers 38 move. This enables the spreading fingers to be set very high and move in a path entirely above the loopers. The throat plate 35 is formed with a recess 52 which extends to the left of the center of the needle slot as viewed by the operator. This is the side of the needle slot toward which the spreading finger moves, and the purpose of the recess is to permit the looper thread to be freely carried laterally by the spreading finger. Then again, by forming a recess in the throat plate, the looper thread may be held well up relative to the upper surface of the throat plate without contacting with the under surface of the throat plate, and this permits the looper thread to be positioned so that the needle in its descent will pass said looper thread at a relatively early period.

In the drawings, the needle thread is indicated at *n* and the looper thread at *l*. In Fig. 6 of the drawings, the looper is at the rear extremity of its stroke and the needle at the lower end of its stroke. It will also be noted that the interlocking of the looper and needle threads has been carried rearwardly by the feed and to a point substantially over the looper as the looper moves in the line of feed and in a direction opposed to the feed as it enters the needle thread loop. As the looper moves forward, it moves into the needle thread loop in the usual manner.

In Figs. 8 and 9, we have shown the

looper as moving forward into the needle thread loop and also as beginning its lateral or needle avoiding movement. The spreading finger is just beginning its lateral movement which is in a direction opposed to the lateral movement of the looper.

In Figs. 10 and 11, we have shown the looper as having reached the forward end of its stroke and the needle is at the upper end of its stroke. The spreading finger is also shown as having moved into engagement with the looper thread 1, the looper thread having been caught by the hooked end of the spreading finger. The spreading finger continues its lateral movement so long as the looper moves laterally.

In Figs. 12 and 13, the looper is shown as having moved rearwardly and the needle point as having passed well beneath the looper thread 1. The spreading finger is just about to release the looper thread which slides off the end thereof. It will be noted that the looper thread is free to swing about the previous interlocking of the looper thread with the needle thread by means of the enlargement in the needle slot. It will also be noted that the spreading fingers move wholly in advance of the needles and the path of movement thereof is restricted so that the fabric engaging sections of the feed dogs may extend along the side the needle holes to points well in advance thereof, as clearly indicated by the construction of the throat plate shown in Figs. 14 and 15. The spreading fingers have two motions only, that is, back and forth, and these movements are substantially at right angles to the line of feed. The spreading fingers engaging the looper threads positively hold the same way from the bodies of the loopers and insure each needle passing between the looper thread and the body of the looper associated therewith.

It will be noted that the entire spreading finger operating mechanism is substantially in advance of the plane of the needles, and owing to this fact and the arrangement of the spreading fingers in lines parallel with the line of feed, a multiple needle sewing machine may be constructed wherein the needles may set very close together. As a matter of fact, the spreading fingers do not in any way limit the distance between the needles.

It is obvious that minor changes in the details of construction and the arrangement of the parts may be made without departing from the spirit of the invention as set forth in the appended claims.

Having thus described the invention, what we claim as new and desire to secure by Letters-Patent is:—

1. The combination with a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the

line of feed, a thread carrying looper associated with each needle, means for moving said thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops means for moving the looping laterally, a spreading finger associated with each looper and disposed wholly in front of the needle associated with said looper, and means for moving said spreading finger laterally back and forth for causing the same to engage the thread of the looper with which said spreading finger is associated for holding said looper thread away from the body of the looper to insure the needle passing between said looper thread and the body of the looper.

2. The combination with a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper associated with each needle, means for moving said thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops means for moving the looper laterally, a spreading finger associated with each looper and disposed wholly in front of the needle associated with said looper, and means for moving said spreading finger laterally back and forth for causing the same to engage the thread of the looper with which said spreading finger is associated for holding said looper thread away from the body of the looper to insure the needle passing between said looper thread and body of the looper, said spreading fingers being disposed in lines substantially parallel with the line of feed.

3. The combination with a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper associated with each needle, means for moving said thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops, a spreading finger associated with each looper and disposed wholly in front of the needle associated with said looper, and means for moving said spreading finger laterally back and forth for causing the same to engage the thread of the looper with which said spreading finger is associated for holding said looper thread away from the body of the looper to insure the needle passing between said looper thread and the body of the looper, and means for supporting each spreading finger whereby the same may be independently adjusted laterally.

4. The combination with a feeding mechanism, a plurality of needles arranged in a

line substantially at right angles to the line of feed, a thread carrying looper associated with each needle, means for moving said thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops, means for moving said loopers laterally, a spreading finger associated with each looper and disposed wholly in front of the needle associated with said looper, means for moving said spreading finger laterally back and forth for causing the same to engage the thread of the looper with which said spreading finger is associated, for holding said looper thread away from the body of the looper to insure the needle passing between said looper thread and the body of the looper, said means for moving the spreading fingers including a single shaft on which the spreading fingers are mounted.

5. The combination with a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper associated with each needle, means for moving said thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops, a spreading finger associated with each looper and disposed wholly in front of the needle associated with said looper, and means for moving said spreading finger laterally back and forth for causing the same to engage the thread of the looper with which said spreading finger is associated for holding said looper thread away from the body of the looper to insure the needle passing between said looper thread and the body of the looper, said means for moving the spreading fingers including a single shaft on which the spreading fingers are mounted, and means for moving said shaft endwise and for giving to said threaded loopers a needle avoiding movement.

6. The combination with a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper associated with each needle, means for moving said thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops, means for moving the loopers laterally, a spreading finger associated with each looper and disposed wholly in front of the needle associated with said looper, and means for moving said spreading finger laterally back and forth for causing the same to engage the thread of the looper with which said spreading finger is associated for holding said looper thread away from the body of the looper to insure the needle passing be-

tween said looper thread and the body of the looper, said spreading fingers being disposed in lines substantially parallel with the line of feed, and said feeding mechanism including a feed dog having fabric engaging sections extending to points well in advance of said needles, along side of said needles and in rear thereof.

7. The combination with a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper associated with each needle, means for moving said thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops, means for giving each looper a needle avoiding movement while in the needle thread loop, a spreading finger associated with each looper, said spreading fingers being disposed wholly in advance of the needles and movable back and forth laterally for engaging the looper thread of the loopers with which they are associated, and means for operating said spreading fingers.

8. The combination with a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper associated with each needle, means for moving said thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops, means for giving each looper a needle avoiding movement while in the needle thread loop, a spreading finger associated with each looper, said spreading fingers being disposed wholly in advance of the needles and movable back and forth laterally for engaging the looper thread of the loopers with which they are associated, and devices connected with the means for giving the loopers their needle avoiding movement for moving said spreading fingers laterally to cause the same to engage their respective looper threads.

9. The combination of a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a throat plate having a needle opening for each needle, a looper associated with each needle, means for moving said loopers in the general direction of the line of feed and in a direction opposed to the feed as the loopers enter their respective needle thread loops, means for giving the loopers a needle avoiding movement, a spreading finger associated with each looper and disposed wholly in advance of said needles, means for moving said spreading fingers laterally for causing the same to engage the threads of the loopers with which they are associated, each needle hole having an en-

largement at one side and at the forward end thereof for permitting free swing of the looper thread so that it may be separated from the body of the looper to permit the needle point to pass between the looper thread and the body of the looper with which it is associated.

10. The combination of a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a throat plate having a needle hole for each needle, a threaded looper associated with each needle and mounted to move in a plane substantially parallel to the line of feed, a spreading finger associated with each looper and located in advance of said needles, said throat plate being cut away on its under face in advance of the needle holes therein for forming a clearance for the spreading fingers.

11. The combination of a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a throat plate having a needle hole for each needle, a threaded looper associated with each needle and mounted to move in a plane substantially parallel to the line of feed, a spreading finger associated with each looper and located in advance of said needles, said throat plate being cut away on its under face in advance of the needle holes therein for forming a clearance for the spreading fingers, each needle hole having an enlargement at one side and at the front end thereof for permitting the free lateral movement of the looper thread when engaged by its respective spreading finger.

12. The combination of a feeding mechanism and a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper associated with each needle, means for moving the thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops, means for giving the loopers a needle avoiding movement while in the needle thread loops, a spreading finger associated with each looper, and means for operating said spreading fingers, said operating means including a carrier in which the spreading fingers may be adjusted longitudinally, and a shaft on which the carrier is mounted, which carrier is capable of being adjusted angularly about the shaft and longitudinally of the shaft.

13. The combination of a feeding mechanism and a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper asso-

ciated with each needle, means for moving the thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops, means for giving the loopers a needle avoiding movement while in the needle thread loops, a spreading finger associated with each looper, a carrier for each spreading finger, a shaft on which the spreading fingers are mounted, means for holding the shaft from oscillating and permitting endwise movement thereof, and means for moving the shaft endwise for moving the spreading fingers back and forth in a direction substantially at right angles to the line of feed.

14. The combination of a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper associated with each needle, means for moving said thread carrying loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops, a spreading finger associated with each looper, means connected to the loopers and the spreading fingers whereby said loopers are moved laterally for their needle avoiding movements and the spreading fingers are moved laterally in an opposite direction simultaneously therewith.

15. The combination with a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper associated with each needle, a carrier on which said loopers are mounted, means for oscillating said carrier for moving the loopers in the general direction of the line of feed and in a direction opposed to the feed as said loopers enter their respective needle thread loops, a spreading finger associated with each looper, a shaft on which said spreading fingers are mounted, means for preventing the spreading finger supporting shaft from oscillating, an oscillating member having a projecting arm, means connecting said arm with the looper carrier for moving said looper carrier endwise for giving a needle avoiding movement to the loopers, a second arm carried by said oscillating member, and means for connecting said second arm to the spreading finger supporting shaft for moving the spreading fingers back and forth.

In testimony whereof, we affix our signatures.

JAMES R. MOFFATT.  
RALPH S. KELSO.