March 19, 1935. C. F. RUBEL 1,995,078

MULTIPLE NEEDLE SEWING MACHINE

Filed July 24, 1933 4 Sheets-Sheet 1

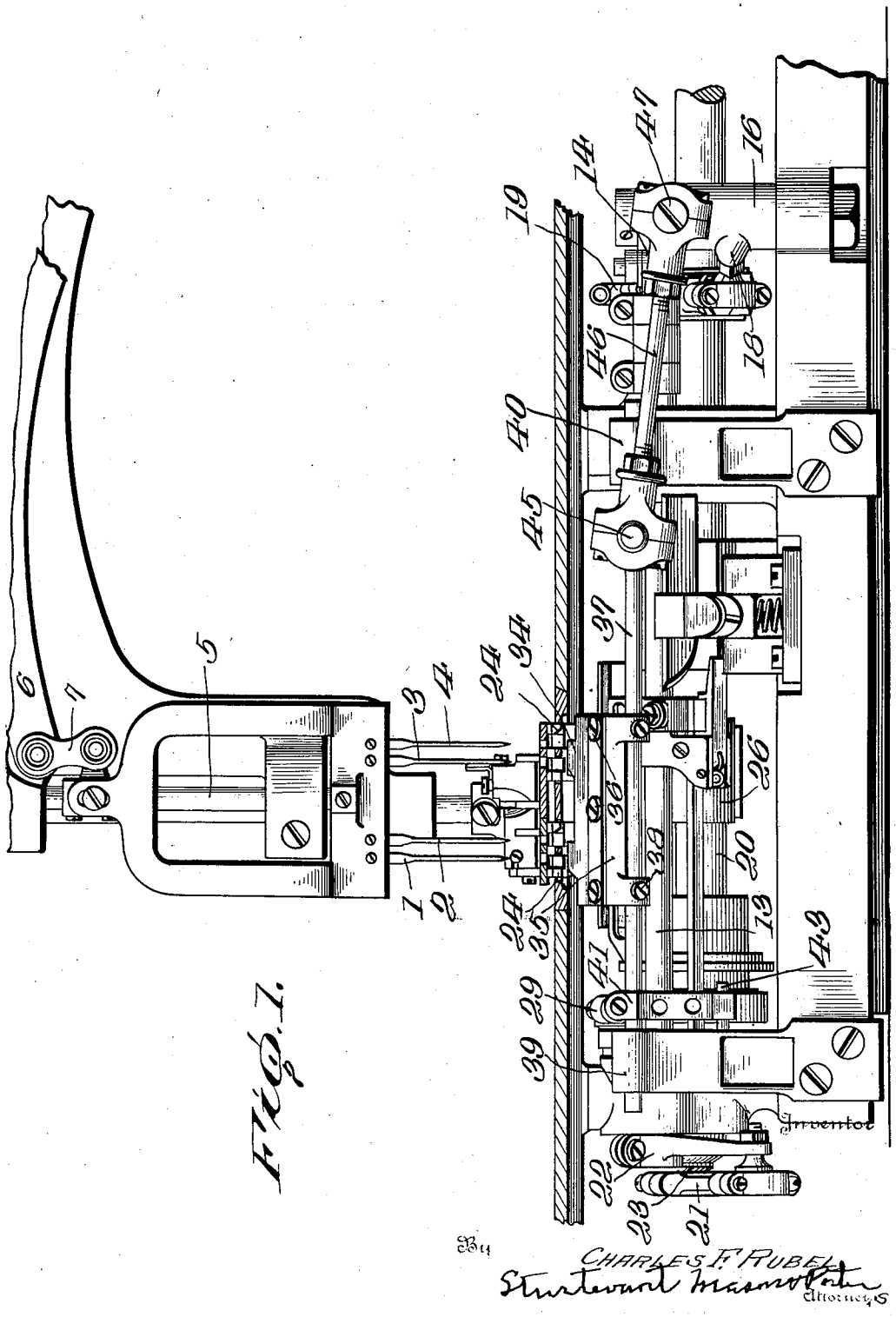


Fig. 1.

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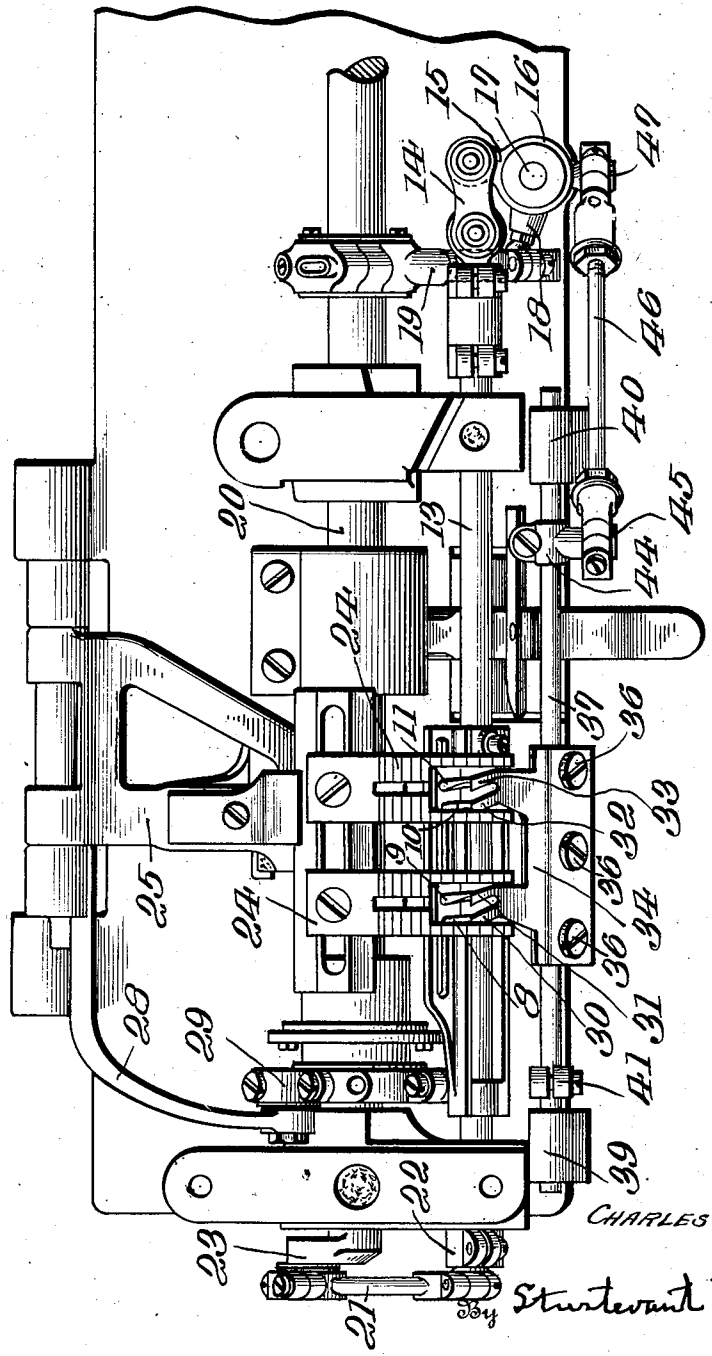


Fig. 2.

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Fig. 3.

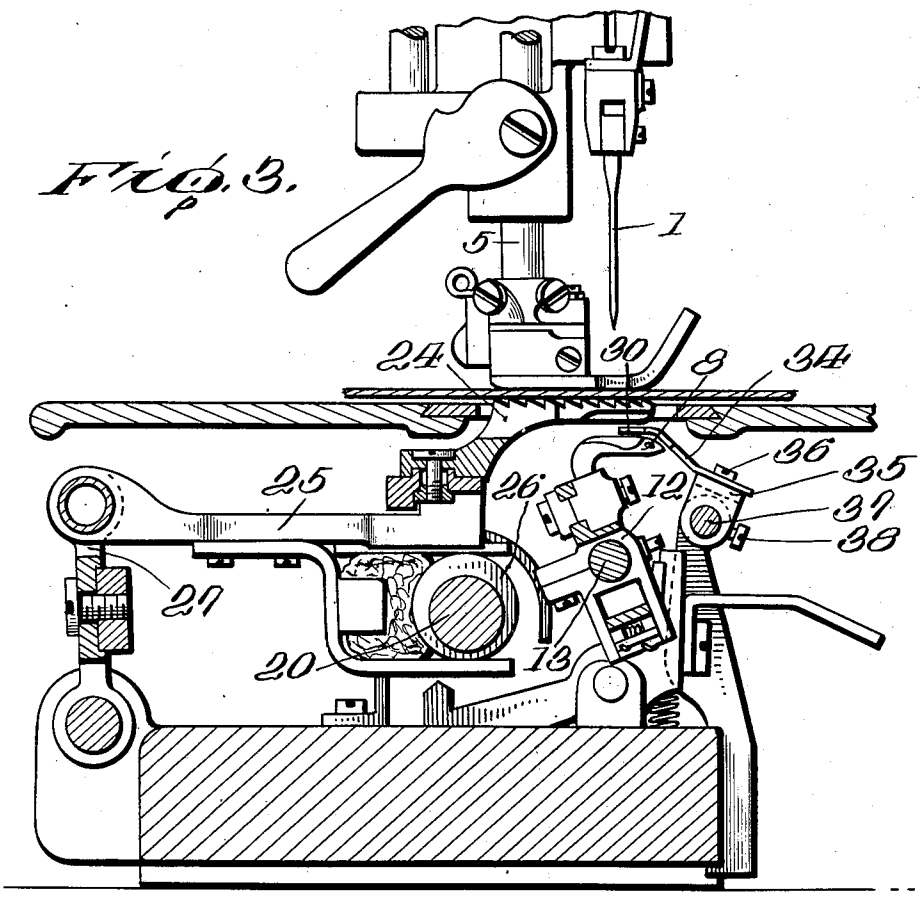
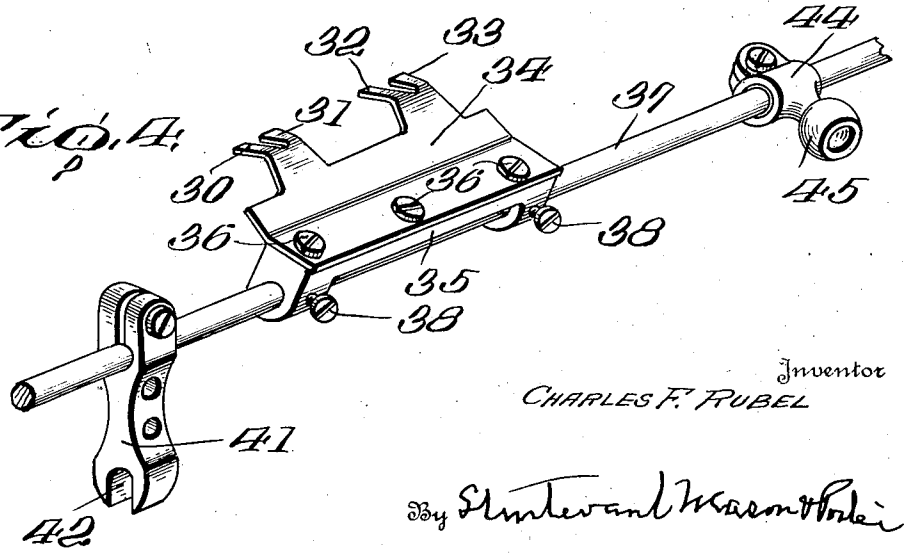


Fig. 4.



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FIG. 5.

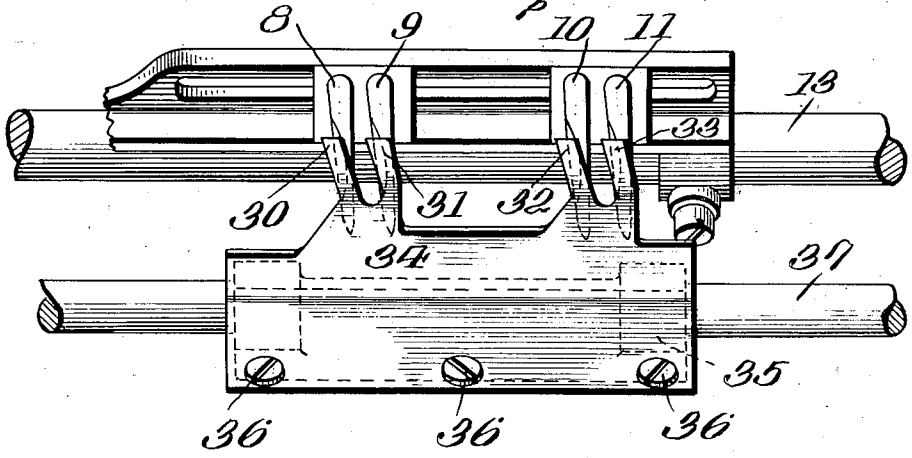


FIG. 6.

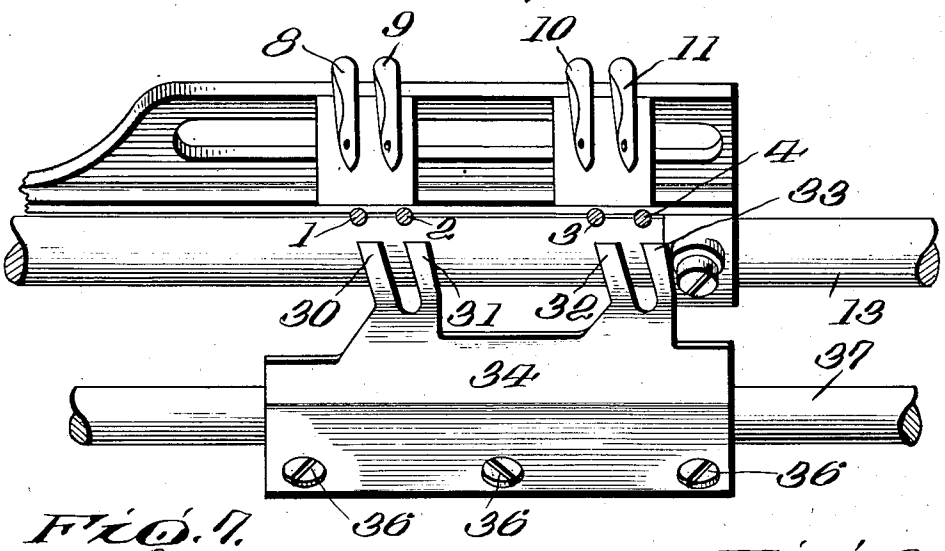


FIG. 7.

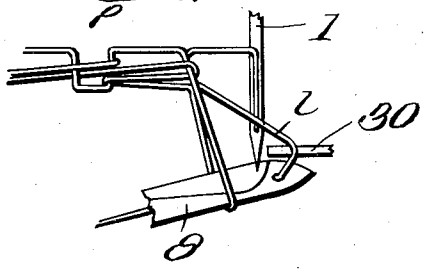
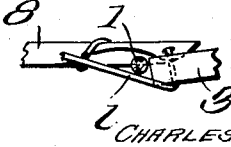


FIG. 8.



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UNITED STATES PATENT OFFICE

1,995,078

MULTIPLE NEEDLE SEWING MACHINE

Charles F. Rubel, Chicago, Ill., assignor to Union Special Machine Company, Chicago, Ill., a corporation of Illinois

Application July 24, 1933, Serial No. 682,016

3 Claims. (Cl. 112—166)

The invention relates to new and useful improvements in a multiple needle sewing machine, and more particularly to a machine of this type wherein a thread carrying looper cooperates with each needle for making independent lines of stitching.

An object of the invention is to provide a machine of the above type having a thread carrying looper moving in the line of feed, with a spreader for each looper, which spreaders are all formed from a single piece of metal with a common connecting shank, so that said spreaders will always remain in the same set position relative to each other as that determined by the manufacturer of the machine.

In the drawings—

Figure 1 is a view partly in vertical section and partly in front elevation showing a portion of the machine embodying the improvement;

Fig. 2 is a plan view of the parts beneath the work support;

Fig. 3 is a view partly in vertical section along the line of feed and in end elevation;

Fig. 4 is a perspective view of the spreaders and the supporting means therefor;

Fig. 5 is a view showing the relative position of the spreaders and the loopers when the loopers are at the forward ends of their stroke;

Fig. 6 is a view showing the relative position of the loopers, spreaders and needles when the loopers are at the rear ends of their stroke;

Fig. 7 is a detail showing one of the loopers and its cooperating spreader, with the looper at the forward end of its stroke and the spreader operating to hold the thread triangle open for the point of the needle to enter, and

Fig. 8 is a plan view of the parts shown in Fig. 7.

The invention has to do with a multiple needle machine which includes a plurality of needles arranged in a line at right angles to the line of feed. Cooperating with each needle is a thread carrying looper, which moves in a plane parallel with the line of feed and in a direction opposed to the feed as it enters the needle thread loop. Associated with each looper is a spreader which moves across the upper face of the looper and engages the looper thread so as to carry it away from the body of the looper, thus opening the thread triangle for the needle to enter. The present invention has to do with the construction of the spreaders in this type of machine. The spreaders are all formed from the same piece of metal. A metal plate is machined and shaped so as to provide projecting fingers which are properly spaced to cooperate with the loopers in a predetermined setting thereof. These spreader fingers are all integral with a common shank formed from the same piece of metal. The metal plate is shaped to provide the spreaders by the manufacturer of the machine. This metal plate is attached to a support which is mounted in the machine for movement in a direction at right angles to the line of feed.

It is thought that the invention will be better understood by a detail description of the machine illustrated in the drawings. The machine shown is a multiple needle machine which includes four needles 1, 2, 3 and 4. These needles are all carried by a needle bar 5 which is reciprocated by a needle lever 6 connected thereto through a link 7. Cooperating with the needle 1 beneath the work support is a thread carrying looper 8. Cooperating with the needles 3, 4 and 5, respectively, are thread carrying loopers 9, 10 and 11. These thread carrying loopers are mounted on a carrier 12 which in turn is supported by a shaft 13. The carrier is attached to the shaft so that it can be released therefrom and moved laterally for threading purposes. The shaft 13 is moved endwise to give to the loopers a needle avoiding movement by a link 14 which is pivoted to a ball stud carried by the end of the shaft. This link 14 is attached to the arm 15 carried by a sleeve 16 mounted for oscillation on a stub shaft 17. Said sleeve is provided with an arm 18 which is connected to an eccentric strap 19 cooperating with an eccentric on the main shaft 20. The shaft 13 is oscillated for moving the loopers into and out of the needle thread loops by means of a link 21 which is connected to a ball stud carried at the lower end of an arm 22 fixed to the shaft 13. The other end of the link 21 is attached to a crank 23 carried by the main actuating shaft 20. This looper operating mechanism and the means whereby the looper carrier may be released from the shaft per se form no part of the present invention, but are shown, described and claimed in the patent granted James R. Moffatt and Albert H. Simmons, January 10, 1922, No. 1,403,093.

The material is fed across the work support by a feed dog 24 carried by a feed bar 25. The feed bar is raised and lowered by an eccentric 26 on the main actuating shaft 20. The feed bar is moved back and forth by a feed rocker 27 which is provided with an arm 28 connected to an eccentric strap 29 cooperating with an eccentric attached to and rotating with the main actuating shaft 20. As shown in the drawings,

the needles 1 and 2 are arranged comparatively close together. The needles 3 and 4 are also arranged close together. These pairs are widely spaced. There is a feed dog 24 associated with each pair of needles. The needles and the loopers and the feed dogs are capable of adjustment at right angles to the line of feed, so that a machine can be changed from one gauge to another. The loopers are so disposed that they move in a plane substantially parallel with the line of feed and in a direction opposed to the feed as they enter the needle thread loops.

Associated with the looper 8 is a spreader finger 30. There are also spreader fingers 31, 32 and 33 associated, respectively, with the loopers 9, 10 and 11. These spreader fingers 30, 31, 32 and 33 are all formed as an integral part of a plate which is shaped so as to provide a common shank 34 for all of the spreaders. The plate is made of steel and is shaped so as to provide these projecting fingers properly spaced to cooperate with the loopers in a predetermined setting thereof for a certain predetermined needle gauge. The plate forming the supporting shank and the spreaders is constructed by the manufacturer of the machine, and the spreaders are properly dimensioned as has already been noted for use on a certain setting of the loopers. These spreaders are non-adjustable. The shank portion 34 carrying the spreaders is secured to a carrier 35 by suitable screws 36, 36. The carrier 35 is mounted on a shaft 37 and is secured thereto by set screws 38, 38. The shaft 37 is mounted for endwise movement in supporting brackets 39 and 40. Fixed to the shaft 37 is an arm 41 which is provided with a fork 42 at its lower end adapted to straddle a pin 43 carried by the bracket 39, (see Fig. 1). The purpose of this arm and pin is to permit the shaft to move endwise, but to prevent any oscillation of the shaft.

The shaft is provided with a collar 44 carrying an arm 45 to which is attached a link 46. This link at its other end is attached to a ball stud 47 carried by the sleeve 16. As the sleeve 16 oscillates, it not only moves the looper laterally, but it also moves this shaft 37 endwise, and thus imparts a lateral movement to the spreaders. When the looper is moved to the right as viewed in Figures 5 and 6, the spreaders are moved to the left. After the loopers have moved forward into the needle thread loops and the needles have been retracted, then the loopers are given the usual lateral needle avoiding movement, which is a movement to the right as viewed in Figures 5 and 6. At the same time, the spreader is moved to the left, and each spreader will contact with the looper thread extending from the eye of the looper to the previous stitch formation of the looper with which it is associated. This continued lateral movement of the looper in one direction and the spreader in the other, will separate the looper thread loop from the body of the looper, thus spreading the thread triangle so that when the needle descends, it will, with certainty, pass between the looper thread and the body of the looper or enter the thread triangle. It will be noted that the face of the spreader which contacts with the looper thread is straight and slightly inclined to a plane at right angles to the path of movement of the spreader, so that when a spreader face contacts with the looper thread, it will retain the looper thread during the retracting movement of the looper a sufficient time for the spreading of the looper thread loop so that the point of the needle may enter the same, and just as soon as the point of the needle has passed the looper thread *l* as indicated in Figures 7 and 8, then the continued backward movement of the looper will cast the thread from the spreader. The straight inclined face greatly facilitates the casting of the thread therefrom.

In Figures 7 and 8, the looper thread of the looper 8 is indicated at *l*. The spreader 30 is shown in contact with a looper thread and carrying the same to one side so as to open the thread triangle for the needle 1 to enter.

The plate from which the spreader fingers are formed is made by the manufacturer, and each spreader finger is shaped so as to properly cooperate with its looper when the loopers in the multiple needle machine are properly set to cooperate with the needles for a certain desired gauge of needles. Inasmuch as the spreaders are not adjustable, there is no chance of the operator shifting the same and thus throwing the cooperating parts out of proper timing. Furthermore, when the spreaders and the supporting plate are formed from a single piece of metal, there is no chance of the spreaders working loose and shifting out of proper position. The structure is strong and durable and the spreader fingers are held in a rigid position relative to the supported shank. The supporting shank is broad and can be firmly attached to the carrier therefor. It is essential that the spreader shall be supported in front of the extreme position to which the loopers are moved and shall project so as to overhang the loopers, and by forming the spreaders and the shank from a single piece of metal, a very rigid support is provided for these overhanging spreader fingers. Then again, the number of parts are reduced so that the structure may be made light, all of which contributes to high speed in this type of machine.

It is obvious that minor changes in the shaping 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 I claim as new and desire to secure by Letters Patent, is—

1. A multiple needle sewing machine including in combination a plurality of needles arranged in a line at right angles to the line of feed, a thread carrying looper associated with each needle and moving in a plane substantially parallel with the line of feed and in a direction opposed to the feed as it enters its needle thread loop, a spreader finger associated with each looper, a common shank supporting all of said spreaders, said spreaders and common shank being integral whereby said spreaders have a rigid set position relative to each other, a carrier for said shank, and means for moving said carrier in a direction transversely of the line of feed for causing the spreader to engage the looper thread loop and position the same for the needle to enter, each spreader having the face thereof contacting with the looper thread straight and slightly inclined to a plane at right angles to the path of movement of the spreader.

2. A multiple needle sewing machine including in combination a plurality of needles arranged in a line at right angles to the line of feed, a thread carrying looper associated with each needle and moving in a plane substantially parallel with the line of feed and in a direction opposed to the feed as it enters its needle thread loop, a spreader finger associated with each looper, a common shank supporting all of said

spreaders, said spreaders and common shank being integral whereby said spreaders have a rigid set position relative to each other, a carrier for said shank, and means for imparting a needle avoiding movement to the looper and for moving said carrier for the spreaders in a direction at right angles to the line of feed and said spreaders in a direction opposed to the movement of the loopers for causing the spreaders to engage the looper thread loops to position the same for the needles to enter their respective thread triangles, said spreaders having the faces thereof which contact with the respective looper threads straight and inclined away from a plane at right angles to the path of movement of the spreaders.

3. A multiple needle sewing machine including in combination a plurality of needles arranged in a line at right angles to the line of feed, a thread carrying looper associated with each needle and moving in a plane substantially parallel with the line of feed and in a direction opposed to the feed as it enters its needle thread loop, a spreader finger associated with each looper, each spreader finger having the face thereof which contacts with the looper thread straight and inclined away from a plane at right angles to the path of movement of the spreader, a common shank supporting all of said spreaders, said spreaders and common shank being integral whereby said spreaders have a rigid set position relative to each other, a carrier for said shank, said shank overlying said carrier and screws for rigidly attaching the same to the carrier, a shaft on which said carrier is mounted, and means for moving said shaft endwise for imparting a lateral movement to said spreaders, said movement of the spreaders being timed so as to cause the spreaders to engage the looper thread loops during the lateral movement of the loopers for spreading the thread triangles for their respective needles to enter.

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