F. H. PERRY.

SEWING MACHINE.

APPLICATION FILED JULY 6, 1910.

1,129,008.

Patented Feb. 16, 1915.

5 SHEETS—SHEET 1.

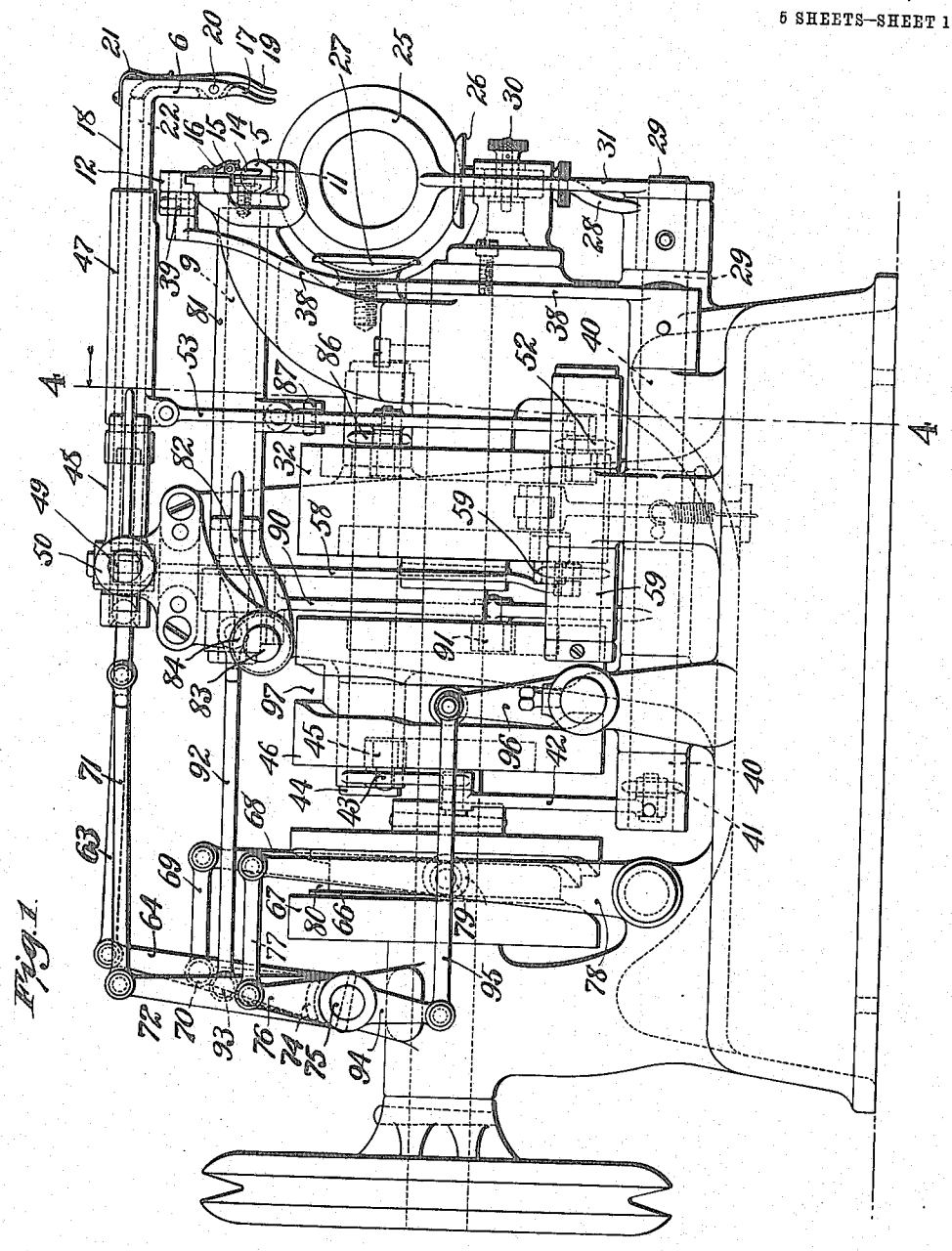

Fig. 1.

Witnesses:

E. C. Wurdeman

K. D. McOhail

Inventor:

Frederick H. Perry.

by Phillips Van Everen & Fish

Attys

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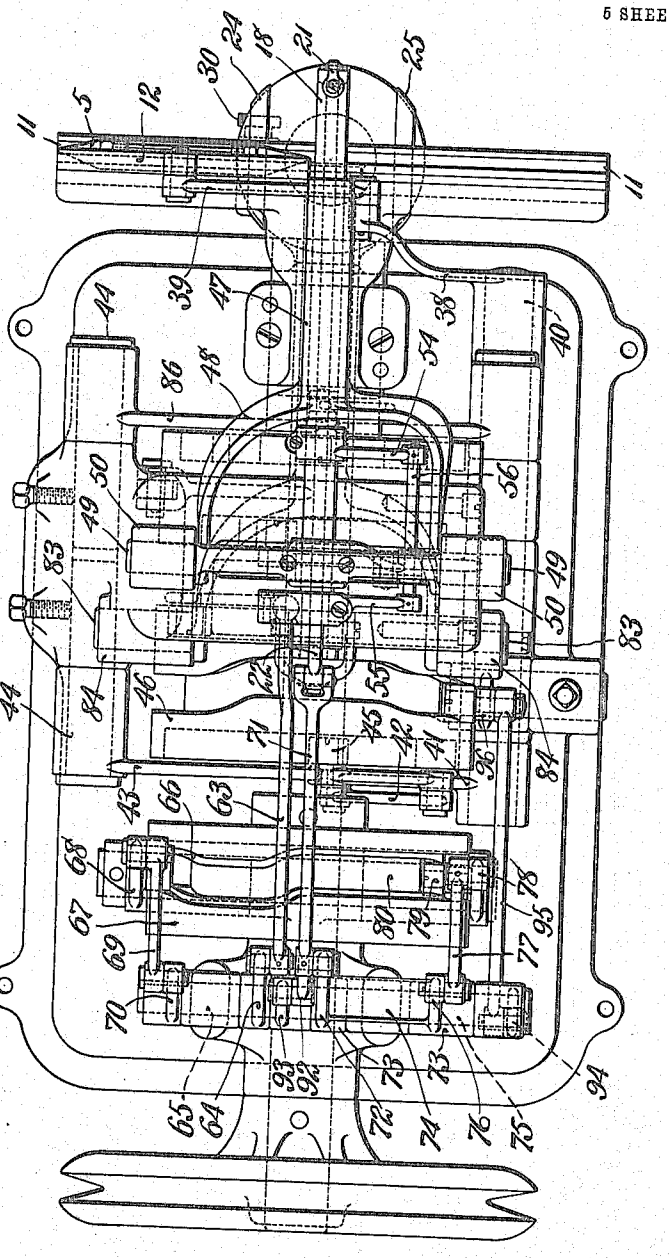

Fig. 2.

Witnesses:

E. Ellwardeman

N. D. McPhail

Inventor:

Fredrick H. Perry.

by Phillips Van Everen & Finch

Attys

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Fig. 3.

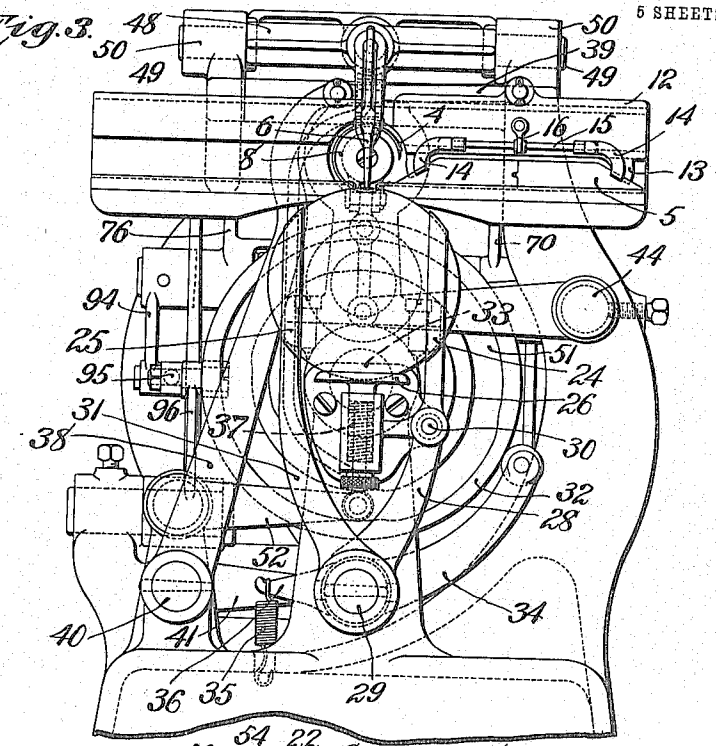
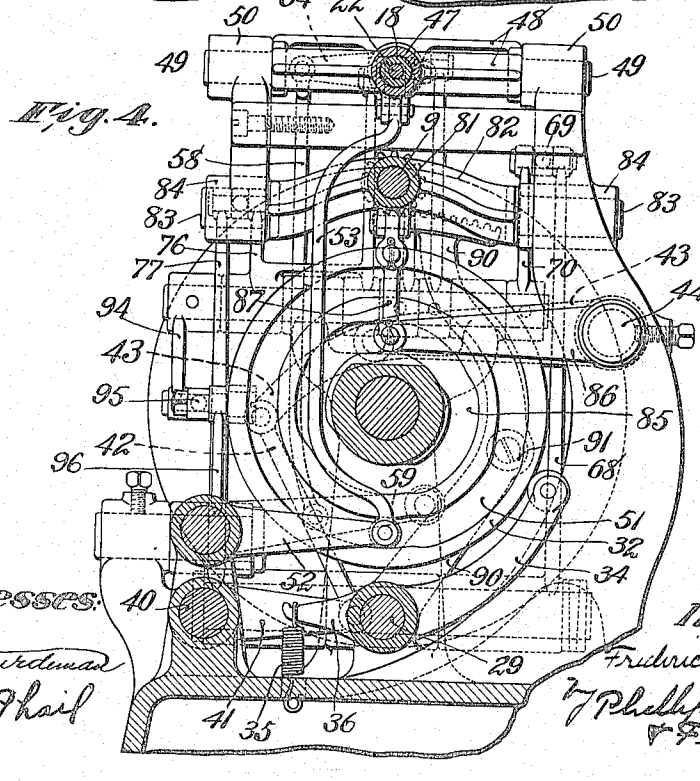


Fig. 4.



Witnesses:

E. C. Curtiss

H. D. McGhail

Inventor:

Frederick H. Perry

by Phillips Van Ewan & Finch

Attys

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Fig. 5.

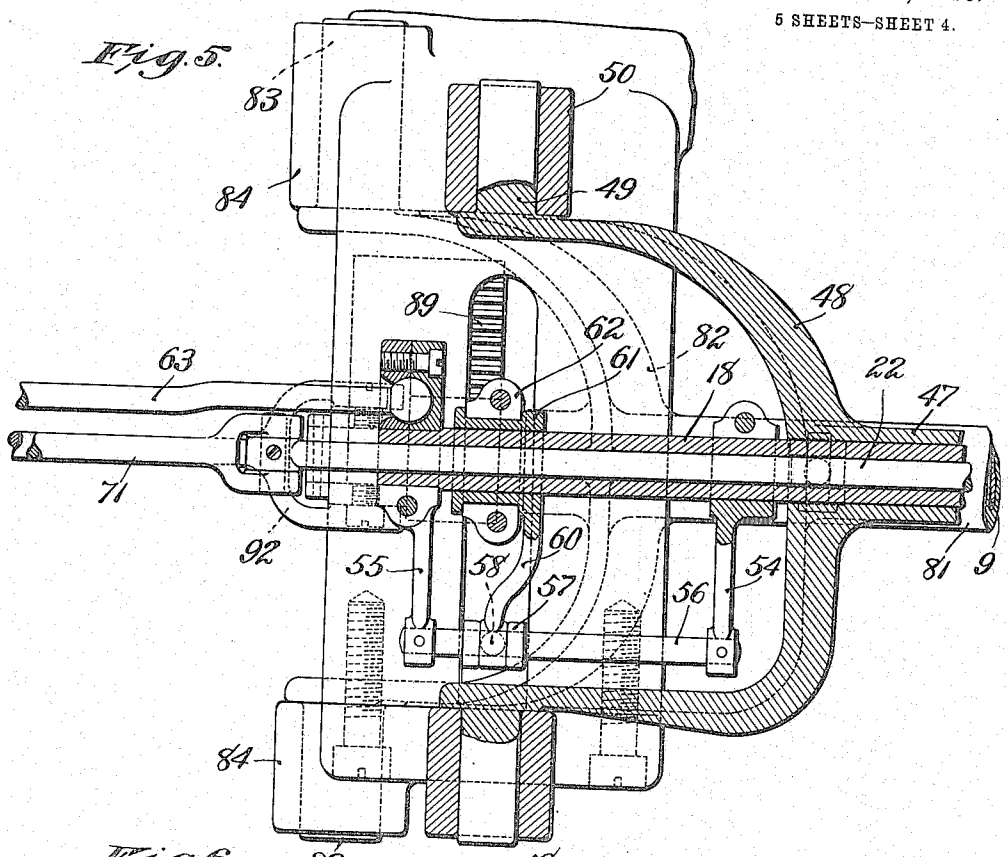
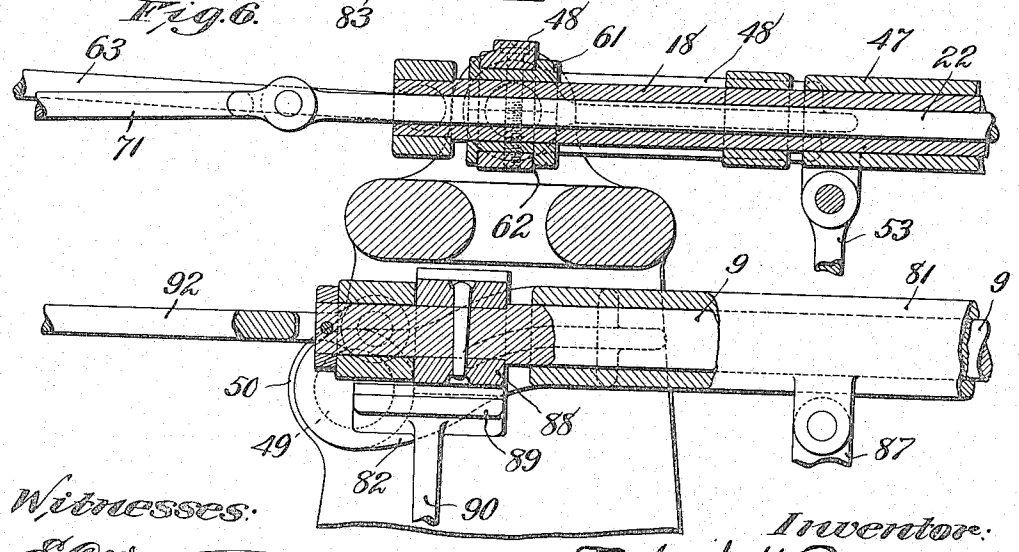


Fig. 6.



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N. D. McPhail

Inventor:

Frederick H. Perry

by Phillips Van Everen & Fish

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5 SHEETS—SHEET 5.

Fig. 7.

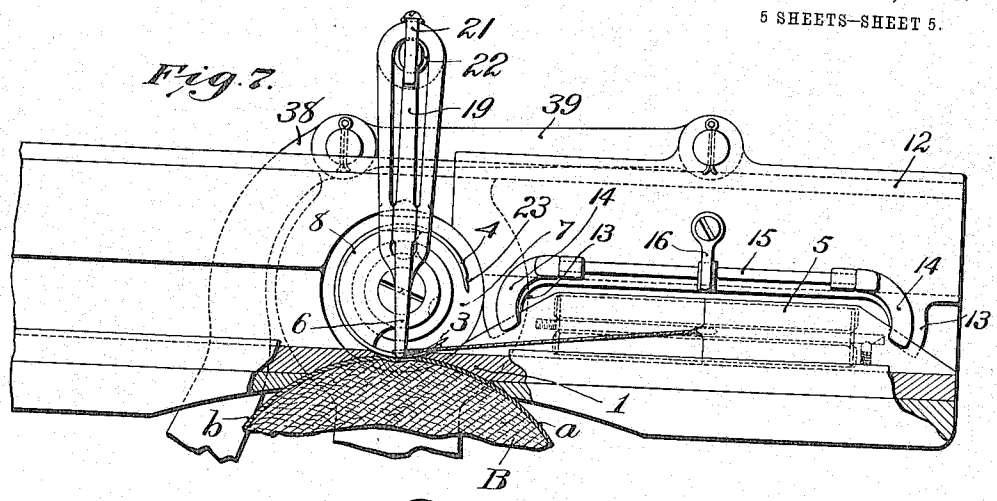


Fig. 8.

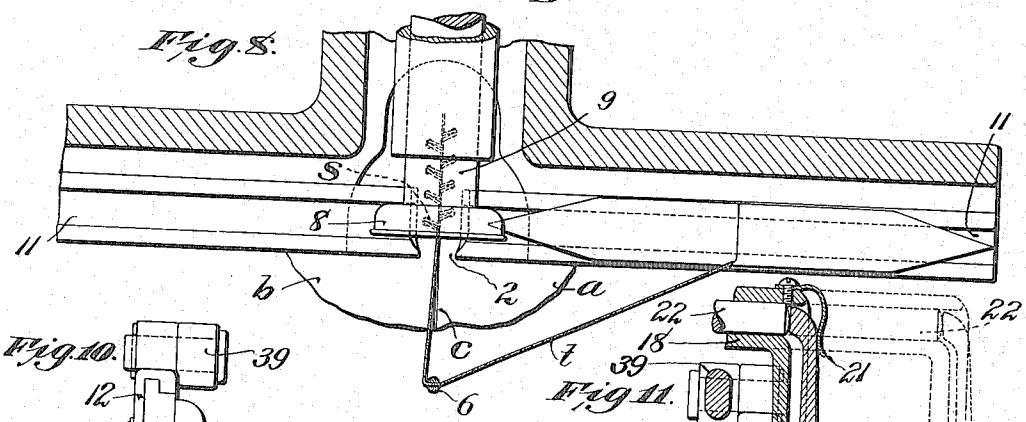


Fig. 10.

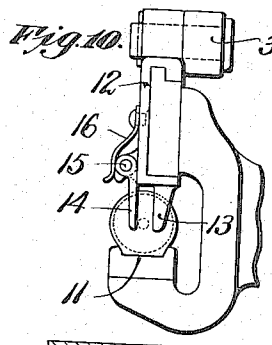


Fig. 11.

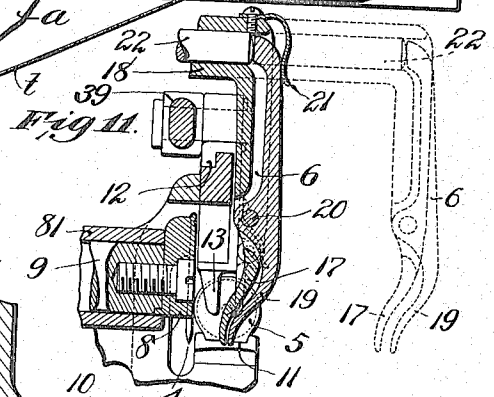
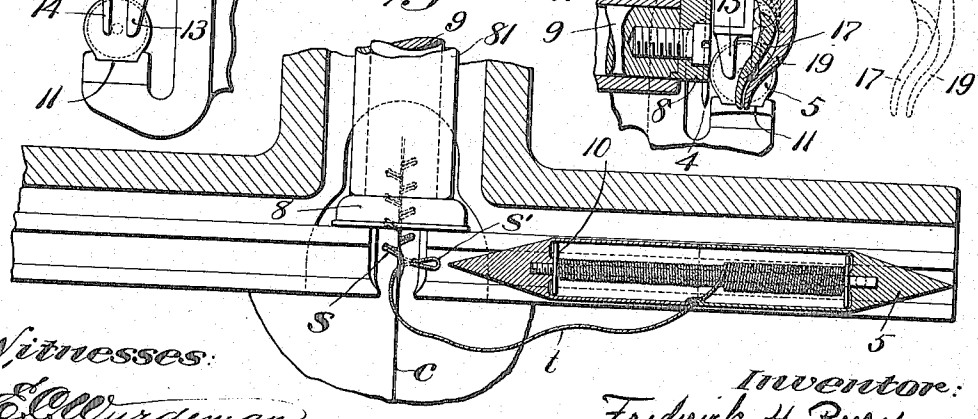


Fig. 9.



Witnesses:

E. C. Burdeman

K. D. McPhail

Inventor:

Fredrick H. Perry

by Phillips Van Everen & Fish

Attys

UNITED STATES PATENT OFFICE.

FREDERICK H. PERRY, OF BEVERLY, MASSACHUSETTS.

SEWING-MACHINE.

1,129,008. Specification of Letters Patent. Patented Feb. 16, 1915.

Application filed July 6, 1910. Serial No. 570,667.

To all whom it may concern:

Be it known that I, FREDERICK H. PERRY, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to a sewing machine for sewing together the abutting edges of two materials, and more particularly to a machine of this character which is adapted to automatically sew the cover of a base-ball or other spherically shaped article.

A base-ball cover is usually formed of two pieces of leather, the abutting edges of which are sewed together by passing a thread up through the leather, across the joint between the edges, and under the leather on the other side, and so on, so that the edges are united by a seam the stitches of which pass alternately over and under the abutting edges, and which is commonly known as a ball-stitch seam. The form of ball stitch seam which has heretofore been employed to unite the edges of the cover of a base-ball or similar article can only be sewn in a practical manner by hand, and so far as I am aware it has been considered impracticable to sew the cover of a base-ball automatically.

It is the object of the present invention to provide a mechanism by which the abutting edges of a base-ball cover, or the abutting edges of similar materials, may be automatically united in a rapid and efficient manner. To this end the invention contemplates the provision in a sewing machine of stitch forming mechanism adapted to sew a seam of stitches uniting the abutting edges of a ball cover, and actuating means for operating said devices to sew the seam.

The construction and arrangement of the stitch forming mechanism is not material to the broader features of the invention, as I believe I am the first to provide a stitch forming mechanism which is adapted to sew together the abutting edges of the cover of a base-ball or similar article. It is preferred, however, to employ a sewing mechanism which is adapted to sew a seam of the ball-stitch type, since it has been found that this form of seam is best suited for uniting the parts of a base-ball cover.

In the most efficient form of the invention which I have yet devised, a sewing mechanism is employed which is constructed to sew a novel and improved form of ball-stitch seam, and this mechanism forms a further feature of the invention. This preferred form of sewing mechanism is constructed and actuated to pass loops of thread alternately up through the two abutting edges of the materials to be sewed, and to pass the thread through each loop before the next loop is formed and passed through the material. By this construction a ball-stitch seam is formed uniting the edges of the materials in which each stitch is locked so that the seam will hold even if one or two stitches break or give way. This seam is also formed with less wear upon the thread during the sewing, since the formation of the successive stitches does not require the entire length of thread used in the seam to be drawn through each needle hole, as in the old form of seam. The wearing qualities of the seam are also increased, since the loops of thread extend from the edges of the cover to the needle holes on the outside of the cover, and present two threads to take the wear, instead of a single thread as in the old stitch.

The features of the invention above referred to, as well as certain further features of invention relating more or less to the construction and arrangement of the parts in the preferred form of the invention, will be readily understood from an inspection of the accompanying drawings and the following detailed description of the machine illustrated therein.

In the accompanying drawings, Figure 1 is a side elevation of a sewing machine embodying the invention in its preferred form; Fig. 2 is a plan view of the machine; Fig. 3 is a front elevation; Fig. 4 is a vertical sectional view on line 4—4, Fig. 1; Fig. 5 is a horizontal sectional view through the rear end of the support for the needle carrying rock shaft; Fig. 6 is a vertical sectional view through the rear end of said carrier and shaft; Fig. 7 is a detail front elevation of

the sewing mechanism, showing the ball, the cover of which is being sewn, in section; Fig. 8 is a sectional plan view of the devices shown in Fig. 7; Fig. 9 is a similar view showing the devices in a different position; Fig. 10 is an end elevation of the shuttle and shuttle driver; and Fig. 11 is a view showing a vertical section through the front end of the needle carrying shaft.

The machine shown in the drawings is especially designed for sewing together the abutting edges of the cover of a base-ball, and is provided with a work support against which the ball is held during the sewing operation, the ball being guided by the operator to properly present the joint between the abutting edges of the cover to the sewing mechanism. The operation of the stitch forming mechanism will be best understood by referring to Figs. 7 to 11. As here shown, the ball B, with the parts *a*, *b* of the cover temporarily secured thereto, as by cement, is held against the under surface of a work support 1, with the joint *c* between the abutting edges of the cover pieces *a*, *b*, in position to register with the stitch forming devices. The work support is slotted at 2, so that the edges of the pieces *a*, *b* may be exposed to the action of the stitch forming devices.

The stitch forming mechanism comprises two oppositely arranged curved needles 3 and 4, a reciprocating shuttle 5, and a stitch tightening gripper 6. The needles 3 and 4 are arranged in line with each other, and the ends of the needles are separated by an intervening space 7, so that both needles may be free of the work during certain periods in the sewing operation. The needles are formed upon or secured to a segment 8 which is secured to the front end of the needle carrying shaft 9. The shaft is so mounted that it may be given a vertical movement to carry the needle segment bodily toward or from the work, may be rocked to thrust either needle through the work, and may be moved longitudinally to feed the work and to carry the needles and needle segment out of the path of the shuttle. The shuttle carries the thread supply, which is wound upon a bobbin 10 within the shuttle, and the shuttle is provided at each end with a pointed nose, so that it may pass in either direction through the loops formed by the needles. The shuttle is mounted to reciprocate in a transverse guideway 11 which extends on opposite sides of the slot 2 in the work support and is reciprocated by a shuttle driver 12. The driver is provided with fingers 13 for engaging the ends of the shuttle at the rear side, and with spring-pressed fingers 14 for engaging the ends of the shuttle at the front side. The fingers 14 are secured on a rock shaft 15, and are held yieldingly against the end of the shuttle by a spring 16, so that the fingers may be raised to enable the shuttle to be removed when desired.

The stitch tightening gripper 6 comprises a thread gripping jaw 17 depending from the front end of a gripper carrying shaft 18, and a coöperating thread gripping jaw 19 which is pivoted at 20 to the jaw 17. The pivoted jaw 19 is moved in a direction to open the grippers by a spring 21 engaging its upper end, and is actuated to close the jaws by a rod 22 extending through the shaft 18. The shaft 18 is so mounted that the gripper may be swung toward the right or left in Fig. 7, and may be moved forward or back in the direction of the feed, as indicated by the full and dotted lines in Fig. 11.

The mode of operation of the stitch forming devices is as follows. Assuming the parts to be in the position indicated in Fig. 8, and the needle segment to be in such position that the space 7 between the needles 3 and 4 is directly above the slot 2 in the work support, the thread *t* will lead from the bobbin within the shuttle through a suitable tension device in the wall of the shuttle, thence between the jaws of the gripper 6, and thence to the last completed stitch *s* of the seam. With the parts in this position, the needle segment has been advanced so that the needle 3 is in position to engage the work at a point in advance of the stitch *s*, and in advance of the nose of the shuttle. The needle segment is now rocked to advance the needle 3 until the point of the shuttle is above the thread at the left of the joint *c* between the edges of the pieces *a*, *b*. The needle carrying shaft 9 is now moved downward so that the forward end of the needle 3 engages the thread *t* above the edge of the piece *b*, and presses the thread and the edge of the piece *b* downward until it is in a plane below the edge of the piece *a*. The needle 3 is now advanced into the position indicated in Fig. 7. As the needle advances, its point passes up through the edge of the piece *a*, and the hook or recess 23 near the end of the needle engages the thread *t* and carries the loop *s'* of the thread up through the piece *a*, the gripper 6 moving forward to give up thread to the needle, or opening to release the thread after it has been engaged with the hook of the needle. The needle carrying shaft 9 is now moved longitudinally in the direction of the feed to feed the work and bring the loop *s'* into line with the nose of the shuttle, and if the thread gripper has not already released the thread, it is operated to release the thread, and is raised preparatory to its movement into the position indicated in full lines in Fig. 11. The needle segment is now rocked to retract the needle 3 and disengage it from the work, and then the needle carrying shaft 9 is retracted to bring the needles and nee-

dle carrying segment into the position indicated in Fig. 9. The shuttle is now moved toward the left in Fig. 7, and passes through the loop s' into a position at the left of the work corresponding to the position indicated at the right in Fig. 7.

After the shuttle has carried the thread through loop s', the gripper 6 is advanced into position above the thread leading from the loop s' to the shuttle, the jaws of the gripper being open. As it advances, the gripper is swung to the left in Fig. 7, and when it comes into position above the thread it is moved downward to carry the jaws down on opposite sides of the thread. The gripper is then closed and is retracted into the position indicated in dotted lines in Fig. 11, drawing up the loop s' and tightening the stitch, the gripper being swung toward the right in Figs. 7 and 8, so that the thread leading from the gripper to the end of the loop s' lies to the right of the joint c, instead of to the left, as in Fig. 8. The needle carrying shaft 9 is now advanced into the position indicated in Fig. 8, is rocked to bring the end of the needle 4 above the thread t, is moved downward to press the end of the needle against the thread and to depress the edge of the piece a, and is then advanced to thrust the needle 4 up through the edge of the piece b. As the needle 4 is thrust through the material it carries a loop of thread with it, and the needle carrying shaft is then retracted to feed the work and bring this loop into line with the nose of the shuttle, the needle 4 being then retracted and the needle segment returned to the position indicated in Fig. 9. The shuttle is then moved toward the right back into the position indicated in the drawings, carrying the thread through the loop passed through the material by the needle 4. The gripper 6 is then actuated to grip the thread between the loop and the shuttle, and to draw up this loop and tighten this stitch. This cycle of operations is repeated, and thus a series of ball-stitches formed which firmly and closely unite the abutting edges of the pieces a and b, the ball B being guided during the sewing operation by the operator to maintain the joint c in proper register with the sewing mechanism.

The ball B may be held during the sewing operation by the operator, but it is preferred to provide a work holding device which holds the ball during the sewing operation, and is operated to intermittently release the ball while the feed is taking place. In the construction shown this work holding device comprises two annular dished plates 24 and 25 adapted to engage opposite sides of the ball, a supporting plate 26 for engaging the under side of the ball, and a dished plate 27 for engaging the rear side of the ball. The holding plate 24 is formed on the upper end of an arm 28 which is pivotally supported upon a shaft 29 and is held in fixed position by a pin 30. The pin 30 may be removed to allow the arm 28 to swing away from the ball when the sewing has been completed and a new ball is to be presented to the sewing mechanism. The holding plate 25 is formed on the upper end of an arm 31 which is secured to the shaft 29. The shaft 29 is intermittently rocked to grip and release the ball at the proper intervals by a cam 32 secured to the main cam shaft 33 of the machine, and arranged to engage a roll on the end of an arm 34 secured to the rock shaft. The roll is held in engagement with the cam by a spring 35 connected to an arm 36 secured to the shaft. The ball supporting plate 26 is pressed upward by a spring 37 which tends to hold the ball continuously against the under surface of the work support 1 during the sewing operation.

The shuttle driver 12 is reciprocated at proper intervals through an arm 38, the upper end of which is connected by a link 39 with the shuttle driver, and the lower end of which is secured to the front end of a rock shaft 40. The rear end of the rock shaft carries an arm 41, the end of which is connected by a link 42 with a lever 43. The lever 43 is pivoted on a stud 44, and carries a roll 45 engaging a cam groove in the cam drum 46 which is secured to the cam shaft of the machine. Through these connections the cam groove in the drum 46 reciprocates the shuttle at the proper intervals.

The gripper carrying shaft 18 extends through a bearing 47 carried by the front end of a yoke 48, the arms of which are provided with trunnions 49 engaging bearings 50, so that the yoke may be rocked vertically to give the gripper its up and down movements at proper intervals. The yoke is rocked through a cam groove 51 (Fig. 4) which operates a lever 52, the end of which is connected by a link 53 with the yoke. The shaft 18 is rocked to swing the thread gripper toward the right and left in Fig. 7 through arms 54 and 55 clamped to the shaft and connected by a rod 56. The rod 56 passes loosely through the arms 57 of a yoke formed on the upper end of a link 58, the lower end of which is connected with a a cam lever 59 operated by a cam groove in the drum 46. The link 57 is held in position during the reciprocation of the shaft 18 by an arm 60 projecting from a sleeve 61 which surrounds the shaft 18, and is held within a bearing 62 formed on the yoke 48. The shaft 18 is reciprocated at proper intervals through a link 63, the front end of which is connected with the hub of the arm 55, and the rear end of which is connected to an arm 64 secured to a short rock shaft 65 (Figs. 1 and 2). The shaft 65 is rocked at

proper intervals by a cam groove 66 formed in a cam drum 67 and operating a lever 68, the upper end of which is connected by a link 69 with an arm 70 secured to the rock shaft.

The rod 22 which opens and closes the thread gripper is reciprocated at proper intervals through a link 71, the front end of which is connected to the rod, and the rear end of which is connected to an arm 72. The lower end of the arm 72 is provided with two hubs 73 connected by a web 74 and loosely mounted upon a rock shaft 75. A second arm 76 projects from one of the hubs 73 and is connected by a link 77 with a cam lever 78 which carries a roll 79. The roll 79 is arranged to engage a cam groove 80 formed in the drum 67 and extending in from the bottom of the cam groove 66.

The needle carrying shaft 9 is mounted within a bearing 81 carried at the front end of a yoke 82 which is provided with trunnions 83 engaging bearings 84, so that the yoke may be moved vertically to carry the needles toward and from the work. The yoke is moved up and down at proper intervals by a cam groove 85 operating upon a cam lever 86, the end of which is connected by a link 87 with the yoke (Fig. 4). The needle carrying shaft is turned about its axis to advance and retract the needles at proper intervals through a pinion 88 secured to the rear end of the shaft, and engaged by a segment 89 formed on the upper end of a lever 90. The lower end of the lever 90 is loosely supported on the rock shaft 29, and the lever is oscillated at proper intervals by a cam groove engaging a roll 91 carried by the lever. The needle carrying shaft is moved longitudinally at proper intervals through a link 92, the front end of which is connected with the rear end of the shaft, and the rear end of which is connected to an arm 93 secured to one end of the short rock shaft 75. The other end of the rock shaft is provided with an arm 94 which is connected by a link 95 with a cam lever 96 which carries a roll engaging a cam groove 97 formed in the drum 46.

While the invention has been illustrated and explained as embodied in a machine for sewing the cover pieces of a base-ball or similar spherical article, it will be understood that various features of the invention are not limited in their application to such a machine, but may be embodied with advantage in any machines designed for sewing together the abutting edges of materials.

It will also be understood that the specific construction and arrangement of the parts is not material, except so far as specified in the claims, and may be varied and modified without departing from the broader features of the invention.

Having explained the nature and object of the invention, and specifically described one form of machine in which it may be embodied, what I claim is:—

1. A sewing machine, having, in combination, stitch forming mechanism adapted to form a ball-stitch seam uniting two abutting edges of material, a work support adapted to support a covered ball in position to be operated upon by the sewing mechanism, and mechanism for actuating the stitch forming mechanism, substantially as described.

2. A sewing machine, having, in combination, means for passing loops of thread alternately up through two abutting edges of material, and means for passing a portion of the same thread through each loop before the next loop is formed, substantially as described.

3. A sewing machine for uniting the abutting edges of materials having, in combination, means including a needle for passing loops of thread alternately through the opposed materials adjacent to the abutting edges, thread handling means for passing thread through the loops, and a stitch setting device including a gripper operating to draw the ends of the loops to the abutting edges and to set the stitch with the ends of the loops secured at the abutting edges, substantially as described.

4. A sewing machine for uniting the abutting edges of materials having, in combination, devices for passing loops of thread drawn from a thread supply alternately through the opposed materials with the closed ends of the loops drawn out alternately on different sides of the seam, and means for passing the thread supply from which the loops are drawn through the closed ends of the loops, substantially as described.

5. A sewing machine for uniting the abutting edges of materials having, in combination, means for passing a loop of thread drawn from a thread supply upwardly through one material, means for passing the thread supply from which the loop is drawn through the loop, means for passing a loop of thread drawn from the thread supply upwardly through the other material, and means for passing the thread supply from which the loop is drawn through this loop, substantially as described.

6. A sewing machine for uniting the abutting edges of materials, having, in combination, means for passing loops of thread alternately through the opposed materials, means for passing a portion of the same thread through the loops, and means for tightening the stitch, substantially as described.

7. A sewing machine, having, in combination, two oppositely acting needles for passing loops of thread alternately up through

two abutting edges of material, a reciprocating shuttle for carrying the thread back and forth through the successive loops, and a thread tightener for tightening each stitch after the shuttle has passed through the loop, substantially as described.

8. A sewing machine having, in combination, needles for passing loops of a single thread alternately through two abutting edges of material, means for passing the thread through the loops, and mechanism for actuating the needles to feed the work, substantially as described.

9. A sewing machine for uniting the abutting edges of materials, having, in combination, stitch forming mechanism including a needle, shuttle and thread holder, and means for actuating the needle to depress the edge of one material and to pass a loop of thread up through the edge of the other material, and means for passing the shuttle through said loop, substantially as described.

10. A sewing machine for uniting the abutting edges of materials, having, in combination, two oppositely arranged needles, mechanism for actuating said needles to pass loops of thread alternately up through the edges of the opposed material, and means for passing the thread in opposite directions through the loops, substantially as described.

11. A sewing machine for uniting the abutting edges of materials, having, in combination, two oppositely arranged needles, means for actuating said needles to alternately carry loops through the two materials, a shuttle, means for passing the shuttle through each loop, a stitch tightener, and means for actuating the stitch tightener to engage the thread between the shuttle and each loop and tighten the loop, substantially as described.

12. A sewing machine for uniting the abutting edges of materials, having, in combination, a work support for supporting a covered ball with the joint between the edges of the cover pieces extending in the direction of feed, stitch forming mechanism, and means for actuating the stitch forming mechanism to form stitches extending across the joint and alternately over the material on one side of the joint and under the material on the other side of the joint, substantially as described.

13. A sewing machine, having, in combination, two oppositely arranged curved hook needles, means for actuating the needles to carry loops of thread alternately up through the abutting edges of materials and to feed the work, means for passing the thread through each loop, and means for tightening the stitch, substantially as described.

14. A sewing machine, having, in combination, stitch forming mechanism constructed and arranged to sew a seam of stitches uniting the abutting edges of a ball cover presented to said mechanism, means for actuating the stitch forming mechanism, a ball holder, and means for operating the holder to intermittently hold and release the ball, substantially as described.

15. A sewing machine, having, in combination, stitch forming mechanism constructed and arranged to form stitches uniting the abutting edges of a ball cover presented to said mechanism and to feed the ball, means for actuating the stitch forming mechanism, a ball holder, and means for actuating the holder to release the ball during the feed, substantially as described.

16. A sewing machine for uniting the abutting edges of materials having, in combination, means including a needle for passing loops of thread alternately through the opposed materials adjacent to the abutting edges, thread handling means for passing thread through said loops, and a stitch setting device operating to bring the ends of the loops to the abutting edges and to set the stitch with the ends of the loops secured at the abutting edges, substantially as described.

17. A sewing machine, having, in combination, stitch forming mechanism constructed and arranged to sew a seam of stitches uniting the abutting edges of a ball cover, means for actuating the stitch forming mechanism, a ball holder comprising opposed dished plates, and means for relatively moving the plates to intermittently clamp and release the ball, substantially as described.

18. A sewing machine, having, in combination, stitch forming devices constructed and arranged to form stitches uniting the abutting edges of a ball cover presented to said mechanism and to feed the ball, means for actuating the stitch forming mechanism, a ball holder comprising opposed dished plates arranged to clamp the ball, and means for actuating the plates to release the ball during the feed, substantially as described.

19. A sewing machine for uniting the abutting edges of materials having, in combination, means including a needle for passing loops of thread alternately through the opposed materials adjacent to the abutting edges, means for passing thread through the loops, means operating on the thread passed through the loops for bringing the ends of the loops to the abutting edges and securing them at the abutting edges, and actuating mechanism for operating said means in timed relation, substantially as described.

20. A sewing machine for uniting the abutting edges of materials, having, in combination, means including two oppositely

directed needles operating to pass loops of thread alternately through the opposed materials adjacent to the abutting edges, thread handling means for bringing the ends of the loops to the abutting edges and securing the same with thread at the abutting edges whereby the abutting edges are sewn together, and actuating means for operating said means in timed relation, substantially as described.

21. A sewing machine for uniting the abutting edges of materials, having, in combination, means including two needles operating to pass loops of thread alternately through the opposed materials adjacent to the abutting edges, means for passing the thread through the loops, means operating on the thread passed through the loops for bringing the ends of the loops to the abutting edges and securing them at the abutting edges, and actuating mechanism for operating said means in timed relation, substantially as described.

22. A machine for sewing a ball cover having, in combination, stitch forming mechanism for sewing a seam of stitches uniting the abutting edges of a ball cover presented to said mechanism, a work support for holding a ball in position to be operated upon by the stitch forming mechanism, and means for actuating the stitch forming mechanism, substantially as described.

FREDERICK H. PERRY.

Witnesses:
N. D. McPHAIL,
WARREN G. OGDEN.