F. LA CHAPELLE.

ATTACHMENT FOR CHAIN STITCH SEWING MACHINES.

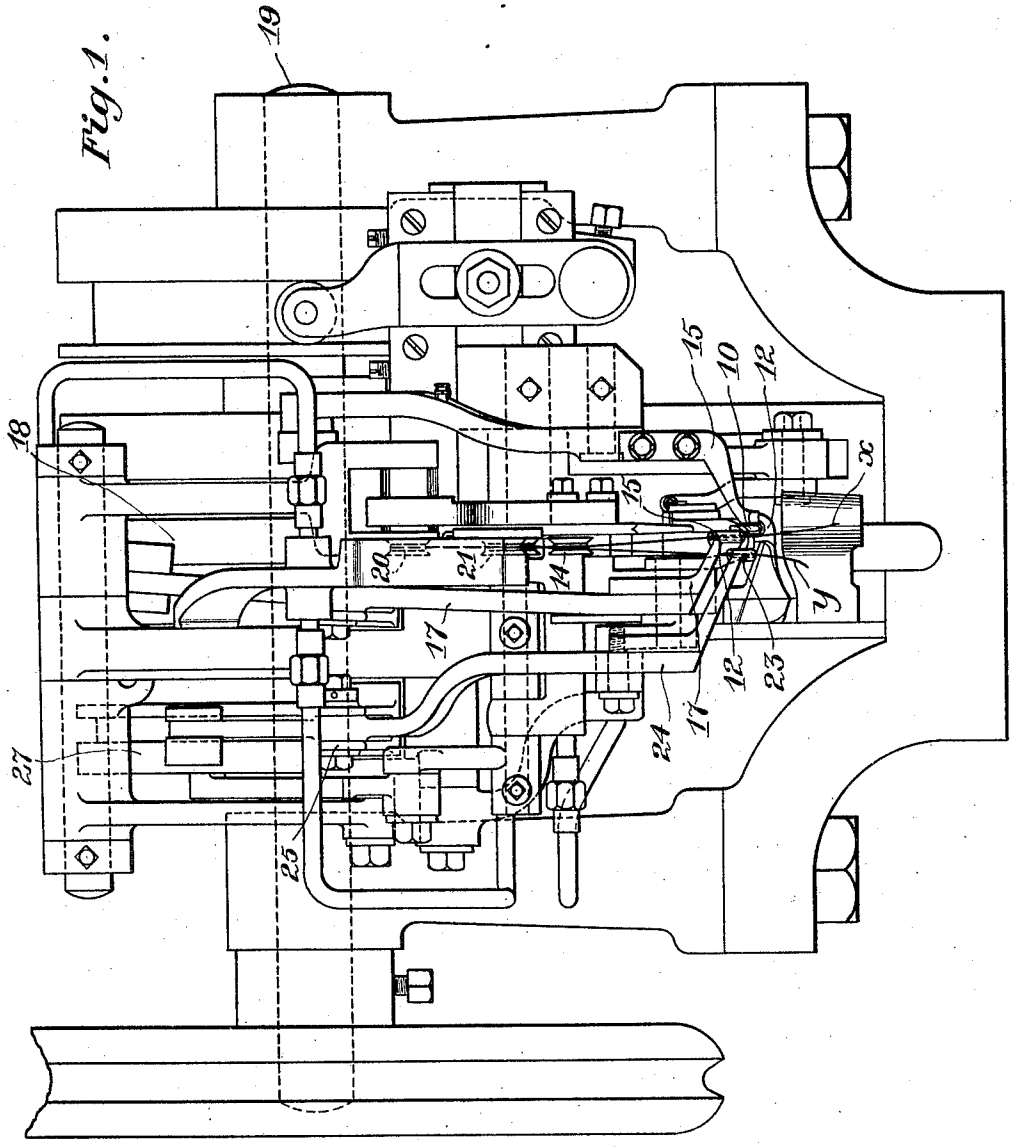
APPLICATION FILED JULY 18, 1906.

1,030,736.

Patented June 25, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



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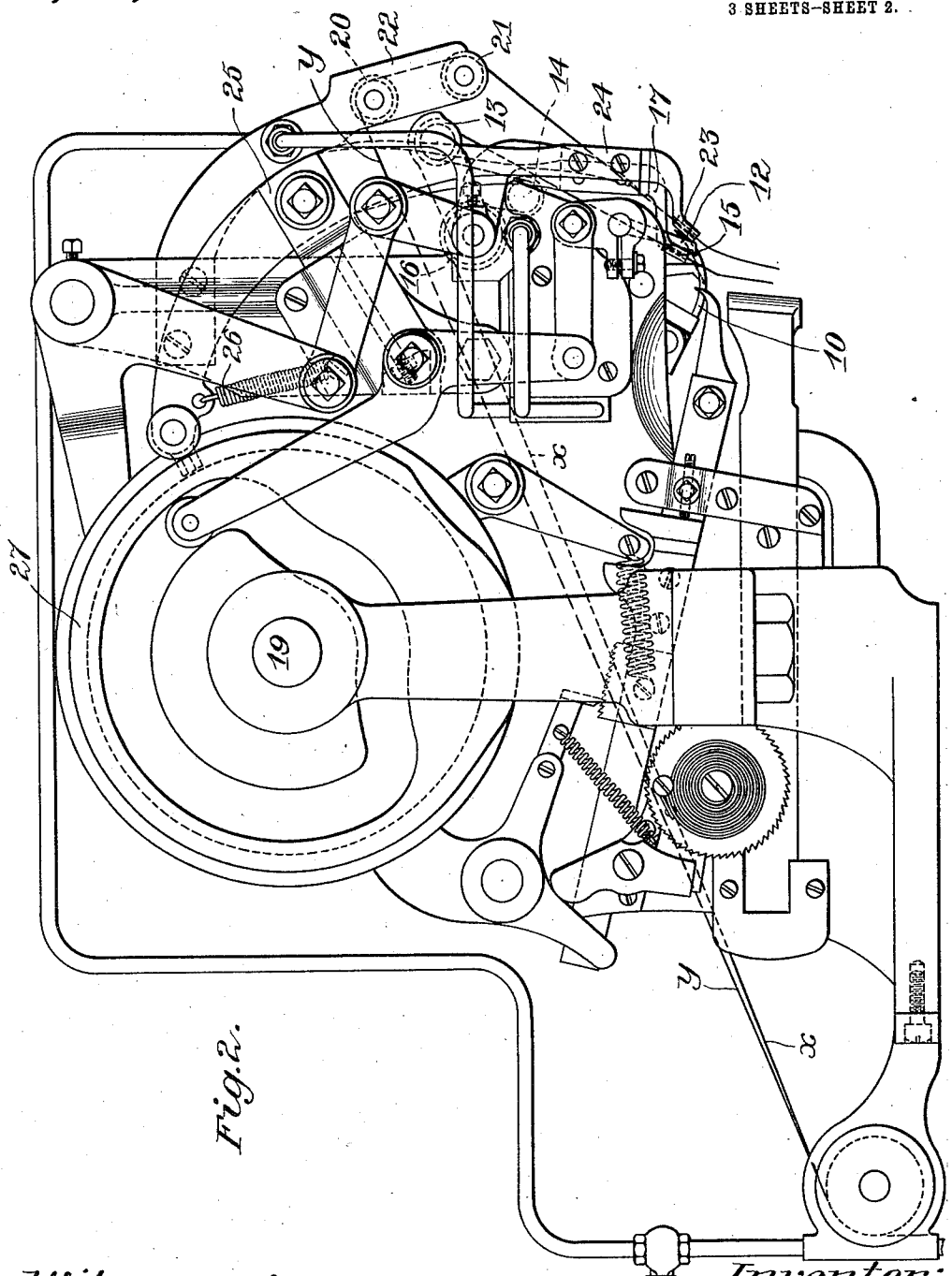

Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 7.

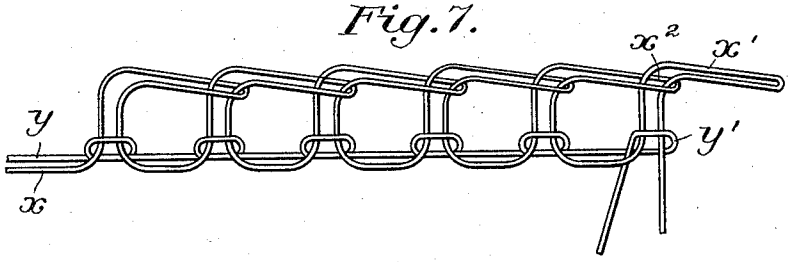


Fig. 3.

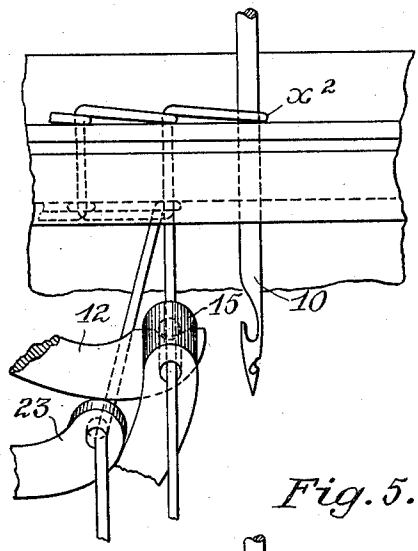


Fig. 4.

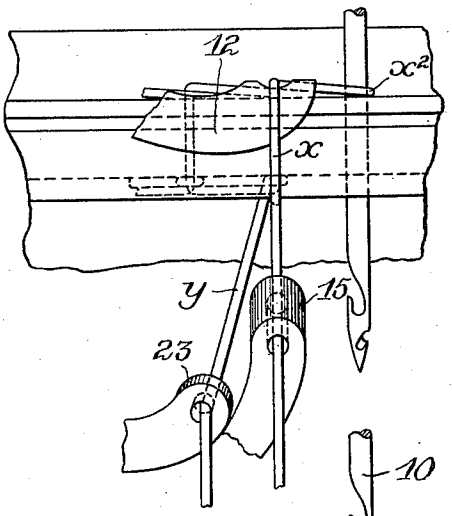


Fig. 5.

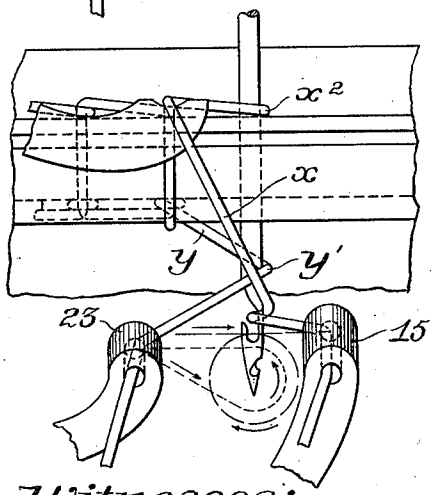
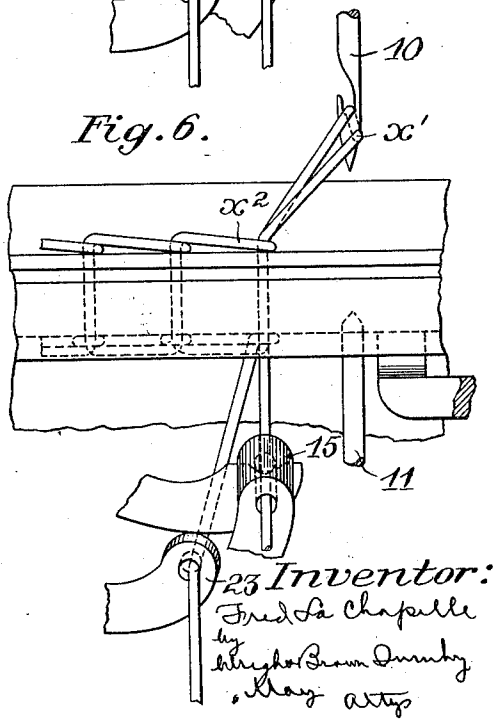


Fig. 6.



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UNITED STATES PATENT OFFICE.

FRED LA CHAPELLE, OF LYNN, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ATTACHMENT FOR CHAIN-STITCH SEWING-MACHINES.

1,030,736. Specification of Letters Patent. **Patented June 25, 1912.**

Application filed July 18, 1906. Serial No. 326,687.

To all whom it may concern:

Be it known that I, FRED LA CHAPELLE, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Attachments for Chain-Stitch Sewing-Machines, of which the following is a specification.

This invention has relation to chain-stitch shoe sewing machines such as are employed for attaching the uppers to the soles of "welt" and "turned" shoes. In the operation of these machines the thread is frequently caused to saw or cut through the "between substance" in forming and setting the stitches, particularly where the inner soles are made of stock of a relatively low grade. This necessitates the employment of inner soles of a much higher grade than is necessary with a consequent increased cost to the consumer, or else causes the production of imperfect shoes with a loss to the manufacturer.

My invention is designed to remedy these evils by providing certain improvements by which inner soles of a stock that has been hitherto non-usable, may be employed and the upper securely attached thereto, without the between substance being cut or injured. In accomplishing these results I employ an attachment comprising an additional looper and its operating mechanism by means of which an auxiliary thread from a suitable source of supply is formed into coils or loops inside the between substance through which the loops of the main or sewing thread are drawn as they are formed and set, thus relieving the between substance from the cutting or sawing action of the sewing thread. Preferably the auxiliary thread is coiled about the needle after it has penetrated the between substance, so that when the needle draws the loop of the sewing thread through the between substance and through the previously formed loop, said loop of sewing thread is pulled or drawn through the loop of the auxiliary thread, and the strain and cutting action of the sewing thread due to the operation of the needle and the stitch setter are borne by the loop of the auxiliary thread and the sewing thread thus forms what I may term a "square" stitch. The auxiliary or additional looper may be mounted in relatively close proximity to the main looper and for the sake of convenience and speed may be operated at the same time that the main looper is in action, though I find it desirable that the operation of the auxiliary looper should be completed prior to the completion of the movement of the main looper so as not to interfere with the latter; and I furthermore find it convenient to so construct the operating mechanism that the auxiliary looper is caused thereby to travel in a direction opposite to the direction of movement of the main looper.

Referring to the accompanying drawings,—Figure 1 represents in front elevation a chain stitch sewing machine having one embodiment of my invention combined therewith or attached thereto. Fig. 2 represents a side elevation of the same. Figs. 3, 4, 5, and 6 represent the relative positions of the needle, the thread finger and the two loopers at different stages in the formation of a stitch. Fig. 7 represents conventionally a chain of stitches.

It will of course be understood at the outset that the invention may be employed in connection with a variety of different chain stitch sewing machines, and that while it is illustrated and will be described in connection with a wax thread machine such as shown in the patent to French and Meyer No. 412,704 dated, October 8, 1889 its use is by no means limited thereto. It will likewise be understood that the particular mechanism which I have illustrated as the best form of the invention now known to me is not the only embodiment of which the invention is capable, and that in the following specification and claims the terms and phraseology which I employ in referring to the invention and the parts thereof, is for the purpose of description and not of limitation except when the context demands it.

As I have previously indicated the machine illustrated on the drawings is, so far as its general features are concerned, substantially similar to that shown and described in Letters Patent No. 412,704. The needle 10 and its actuating mechanism, the awl 11 and its actuating mechanism, the thread finger 12 and its actuating mechanism, the take-up 13 and its actuating mechanism, the auxiliary take-up 14, the main looper 15 and its operating mechanism are all substantially similar to those illus-

trated in the said Letters Patent, and need not be described in detail. In conjunction with the parts enumerated are the usual channel guide and work rests which are operated in the ordinary way, and which are so well known as to need no detailed description.

The sewing thread which is indicated at x after passing through the guide 16 and under the auxiliary take-up 14 and over the take-up 13, passes down to the main looper 15, being drawn from a suitable source of supply which is not shown. The looper arm 17 is swiveled and is given its proper movement by the cam 18 which is mounted upon the main shaft 19. The extra or auxiliary thread which as I have previously stated is coiled about the bases of the loops of the sewing thread on the inside of the seam, is drawn from a suitable source of supply and is indicated at y. It passes around guides 20 and 21 which are located upon a suitable support 22 attached to the frame of the machine, and thence downward to an extra or auxiliary looper 23. This auxiliary looper is mounted upon a looper arm 24 which is pivoted in a swiveled bearing 25 similar to that in which the main looper is mounted. The rear upper end of the looper arm is held by a spring 26 against a cam 27 on the main shaft 19 which imparts to the looper arm such movement as to move the looper 23 in the substantially circular path indicated by the small dotted line in Fig. 5. The cam 27 need not be a separate cam, as a cam path and a cam surface may be formed on the cam 18 which operates the main looper. As illustrated, however, it is a separate cam and in its face is formed a cam groove with which coöperates the lever for operating the thread finger 12. Preferably the cams 18 and 27 are so formed that the two loopers 15 and 23 begin their respective movements at substantially the same time and are caused to move in opposite directions as indicated in Fig. 5, the looper 23 however, completing its movement prior to the time the looper 15 completes its movement.

The extra or auxiliary looper 23 and its actuating mechanism together with the support 22 and the guides for the auxiliary thread constitute, as it were, an attachment which may be added or attached to numerous machines which are now in daily use without requiring the substantial alteration of said machines.

The method of forming a stitch, and a series of stitches forming the seam, are clearly shown in Figs. 3 to 7 inclusive. Referring particularly to Figs. 3 to 6, the parts are shown at the instant that the stitch has been set and the needle is in the work. At this time the thread finger 12 has been moved to an inactive position. In the operation of the machine the thread finger 12 is then moved to its active position as shown in Fig. 4, so as to raise the sewing thread in the usual manner, the two loopers at this time being in the respective positions illustrated. The two loopers 15 and 23 are then operated and are moved through the paths illustrated by the dotted lines in Fig. 5. The effect of this is to pass the auxiliary or extra thread y around the needle in one direction above the hook or barb and to lay the sewing thread x in the opposite direction around the needle and into the hook or barb, the looper 23 returning to its initial position and the looper 15 pausing temporarily in the position shown in Fig. 5. Thus at this time there has now been formed upon the needle a loop y^1 of the auxiliary thread through which the loop x^1 of the sewing thread may be drawn upward and through the work. As the needle moves upward it carries with it the loop x^1 which passes through the loop y^1 and through the loop x^2 of the previously formed stitch. After the needle has cleared the work, the awl penetrates the work and feeds it, during which time the looper 15 returns to its initial position. The needle next descends through the aperture formed in the work by the awl, and the loop x^1 is tightened by the take-up thus completing one cycle of operations of the machine.

Fig. 7 is a conventional illustration of the seam and the threads are shown as formed with open coils. It will be understood, however, that in actual practice the extra or auxiliary thread y^1 is formed in close coils or loops about the bases of the loops of the sewing thread, so that as the loops of the sewing thread are drawn upward through the work and the stitches are set, the between-substance is protected from the sawing or cutting action of the sewing thread by the coils or loops of the auxiliary or extra thread. Those portions of the sewing thread which pass through the between substance form substantially right angles with relation to those portions of the thread which lie on the opposite sides of the between substance, and thus it is that I term the stitch a "square" stitch in contradistinction to a stitch in which the threads form a substantially elliptical figure as ordinarily.

As I previously stated, it will be apparent that the use of my invention enables the manufacturer to use inner soles formed of stock which has been previously incapable of use such as from thin or soft leather which would be cut by the sewing thread when sewed in the usual manner. Hence, it is possible to manufacture shoes at a lower cost than has been previously possible, at the same time preserving the usual quality of the shoe. The inner sole of a shoe experiences but little wear and in my opinion there is no necessity for the employment of a fine

quality of leather for their manufacture, their principal function being to provide means for attaching the upper, welt and the outer sole together, and to permit of the proper lasting of the upper. I secure an additional result by the employment of the extra thread, to wit, that of making the shoe more water-proof than heretofore. The loops of the extra thread are drawn partly into the apertures through which the needle passes so as to completely fill the apertures and consequently prevent the leakage of water therethrough.

I have referred to the side of the between substance (or work) or the seam on which the loops of the sewing thread are enchained, as the "outside" or "needle-side," and the side of the between substance (or work) or the seam on which the loops of the extra threads are formed as the "inside" or "looper-side," but it will be understood that these terms are merely relative. I have also referred to the coils or loops which encircle the bases of the enchained loops as being formed of "thread" and of course by that term, I mean to include wire, tape, or other equivalent. I have further employed the term "auxiliary looper" as distinguishing the part or member 23, and means to thereby include any other member or instrument which causes or effects the formation of the coils or loops of the extra or auxiliary thread.

I do not herein claim the stitch or the method of making the same, as the same are set forth and claimed in my co-pending application Serial No. 332,970, filed September 1, 1906.

What I claim is:

1. In a shoe sewing machine, stitch forming mechanism including a hooked needle for successively drawing loops of sewing thread through the work, and means for forming about the bases of said loops on the side of the work away from the needle relatively tight encircling loops of an auxiliary or extra thread, equal in number to the loops of the needle thread.

2. In a chain stitch sewing machine, the combination with the chain stitch forming mechanism, including a hooked needle and a main looper for the needle thread, of an auxiliary looper for forming loops or coils of an auxiliary or extra thread on the main looper side of the work, through which the hooked needle may draw the loops of the needle thread, and means for operating said auxiliary looper to form loops to encircle the loops of needle thread.

3. In a chain stitch shoe sewing machine, the combination with the stitch forming mechanism, including a hooked needle, of an auxiliary looper and its operating mechanism for causing said looper to form a coil or loop encircling the end of the needle projected through the work through which coil or loop the hooked needle may draw a loop of needle thread.

4. In a wax thread shoe sewing machine, the combination with the stitch-forming mechanism, including a main looper and its operating mechanism, of an auxiliary looper for an extra thread and its operating mechanism, said operating mechanisms being constructed and arranged to move said loopers in opposite directions about the needle to lay the loops on the hooked end of said needle after the hooked end has passed through the work.

5. In a wax thread shoe sewing machine, the combination with the chain stitch-forming mechanism, including a hooked curved needle and a main looper and its operating mechanism, of an auxiliary looper for an extra thread and its operating mechanism, said operating mechanisms being constructed and arranged to operate said loopers to lay their respective threads about the hooked end of the needle with the loop of extra thread between the work and the loop of sewing thread in position to encircle the loop of sewing thread when the needle is retracted.

In testimony whereof I have affixed my signature, in presence of two witnesses.

FRED LA CHAPELLE.

Witnesses:
M. B. MAY,
E. BATCHELDER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."