

HAND STITCH SEWING MACHINES FOR MEN SUIT MANUFACTURING

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Abstract: *Hand stitches seams along edges of lapels, collars and pocket flaps on a men jacket help to fix canvas interlining under face fabric, keep the edges flat and prevent them from rolling or curling. Traditionally hand stitches seams also indicate high quality of the suit. Real hand stitch machines imitate had stitch 209. Depending on the length of the top and bottom stitch parts the machines can create pick stitches, saddle stitches and other stitch patterns. One group of the machines create stitches by help of a hooked needle, other machines use a double pointed needle. The machines work with limited length threads, most often with 90 cm and 120 cm long ones. The hand stitch seams can to be sewn with special waxed silk threads or regular threads. To increase work productivity and quality the machines use manual or auto thread trimming devices, reverse stitch function, half stitch option, seam beginning and end securing, programmable stitch type, sewing speed, stitch length, thread trimming time.*

Keywords: men suit manufacturing, saddle stitch, pick stitch, real hand stitch machine, hook needle, double pointed needle.

ŠIVAĆE MAŠINE RUČNIH UBODA ZA IZRADU MUŠKIH ODELA

Apstrakt: *Šavovi ručnih uboda na reverima, okovratnicima, poklopcima i letvicama džepova na muškom sakou fiksiraju međupodstave zajedno sa osnovnim materijalom, izravnavaju krajeve sakoa i formiraju njihov željeni oblik. Tradicionalno šavovi ručnih uboda ukazuju i na visok kvalitet sakoa. Mašine pravih ručnih uboda imitiraju ručni ubod 209. Zavisno od dužine gornjeg i donjeg dela uboda mašine izrađuju tačkasti ubod (pick stich), ubod sedla (saddle stitch) i druge dezene uboda. Ručne ubode mašine formiraju uz pomoć kukaste igle ili igle sa dvostrukim vrhom. Mašine rade sa koncem ograničene dužine, najčešće dužine 90 cm ili 120 cm. Koristi se svileni konac sa voštanom prevlakom ili obični konac. Za poboljšavanje produktivnosti rada mašine su opremljene sa manualnim ili automatskim uređajem za sečenje konca, opcija izrade obrnutog uboda, izrade polu uboda, učvršćivanja početka i kraja šava, mogućnosti programiranja dužine i dezena uboda, brzine šivenja, vreme sečenja konaca.*

Ključne reči: izrada muškog odela, ubod sedla, tačkasti ubod, mašina pravih ručnih uboda, kukasta igla, igla sa dva vrha.

1. INTRODUCTION

To ensure high productivity work process, wide range of special sewing machines are developed to manufacture men suits in industrial way. They replace temporary and permanent hand stitches with machines stitches of the same or different structure and appearance but the same application [1,2].

Permanent decorative hand stitch seams use to be sewn on edges of lapels, collars, pocket flaps, front lines and other places of men jackets and vests [3,14].

In tailored suit these small almost invisible stitches help to fix canvas interlining under face fabric, keep the edges flat and prevent them from rolling or curling [3,4]. With time hand stitch seams got also important decorative function (See Fig. 1). They are sewn with waxed silk threads in the colour of the jacket or in contrast colour [3]. The hand stitch seams along lapels and a collar of the jacket indicate high quality of the suit, the best materials and complicated manual or mechanized technologies used in its manufacturing process.

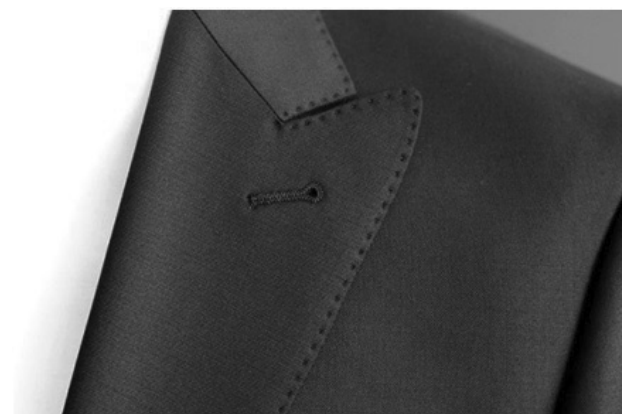


Figure 1: Seams of pick stitches along lapels of a jacket
Slika 1: Šavovi tačkastih uboda na reveru sakoa

The machines which imitate hand stitch 209 [5], (see Fig.2, 3, 4) are called *real hand stitch machines* (can be used also other names, such as, *decorative hand stitch machine, pick stitch and saddles stitch machine, pin point and saddle stitch machine*). They are developed by companies: Juki, Japsew, AFM, Complett, ASS, Global, New-tech, Alfa, Foxsew, others. Compar-

ing with other type sewing machines, they are slow. Their speed is only 350-500 r.p.m.

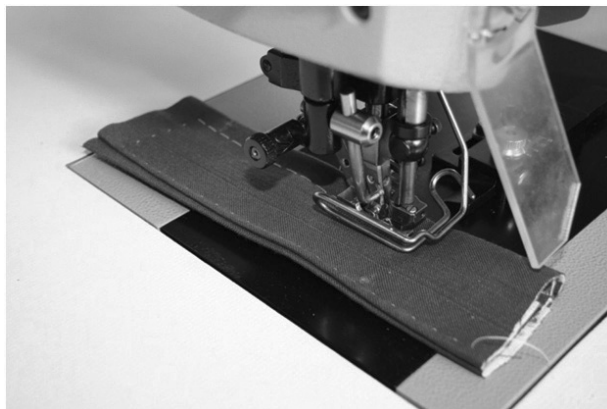


Figure 2. A sewing machine forming hand stitches type 209
Slika 2: Šivaća mašina pravi ubodi 209

2. STITCH PATTERNS

One complete stitch 209 consists of two parts - a top stitch which lies on the top fabric surface and a bottom stitch which is created on the bottom fabric surface [5], (see Fig.4). Every part of the stitch is formed in separate work step of the machine.

Depending on the length of the top and bottom part of the stitch, different stitch patterns can be created:

- *pick stitch* - top and bottom stitches are very short almost like small dots (see Fig.1 and Fig.4.1);
- *saddle stitch* - the top and the bottom stitches have equal length (see Fig.4.2);

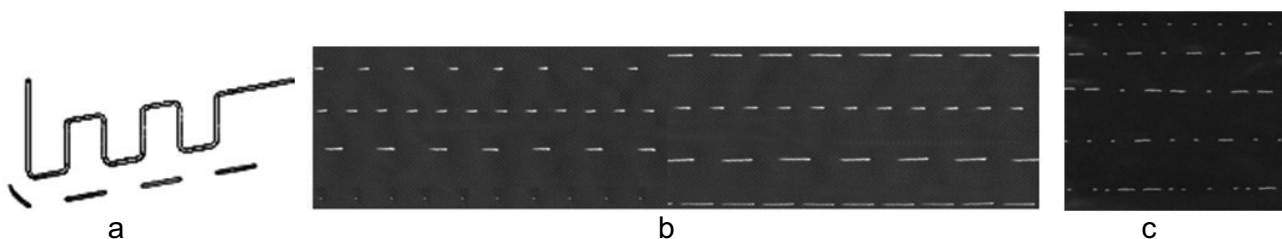


Figure 3: Hand stitches 209 (a) and their seams (b,c)
Slika 3: Ručni ubodi 209 (a) i njihovi šavovi (b)

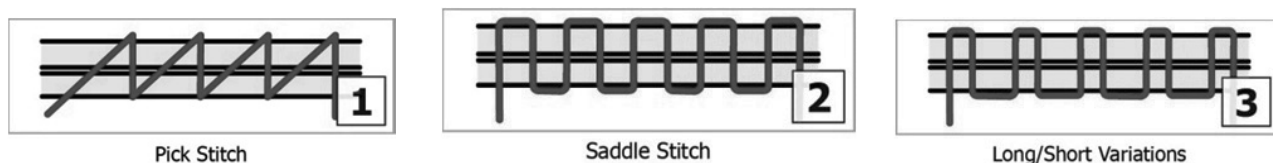


Figure 4: Different hand stitch 209 patterns: pick stitch (1), saddle stitch (2), long/short variants (3).
Slika 4: Različiti dezeni ručnih uboda 209: tačkasti ubod (1), ubod sedla (2), i dugi/kratki ubodi (3)

- *long/short variations* - longer top stitches and shorter bottom stitches or vice versa (see Fig.4.3);
- *irregular stitches* - all different variations of changing length stitches on both fabric surfaces, for example, two long/one short, three short/two long, other variants (see Fig.3.c).

Stitch length starts from 0.5mm (pick stitch) to 7mm, 8mm, up to 10mm.

3. STITCH FORMATION PRINCIPLES

The real hand stitch machines use two different kind of stitch formation mechanisms with differently shaped needles. One group of the machines create stitches by help of a hooked/ bearded needle (Japew, Global, Alfa, Foxsew, Complett, New-tech, ASS), [6,7,8] other machines use a double pointed needle (AFM, Juki), [9,10,11].

Hook needle (see Fig.5): The stitch is formed by help of three main components: a hooked needle, an upper thread hook and a lower thread hook. In the

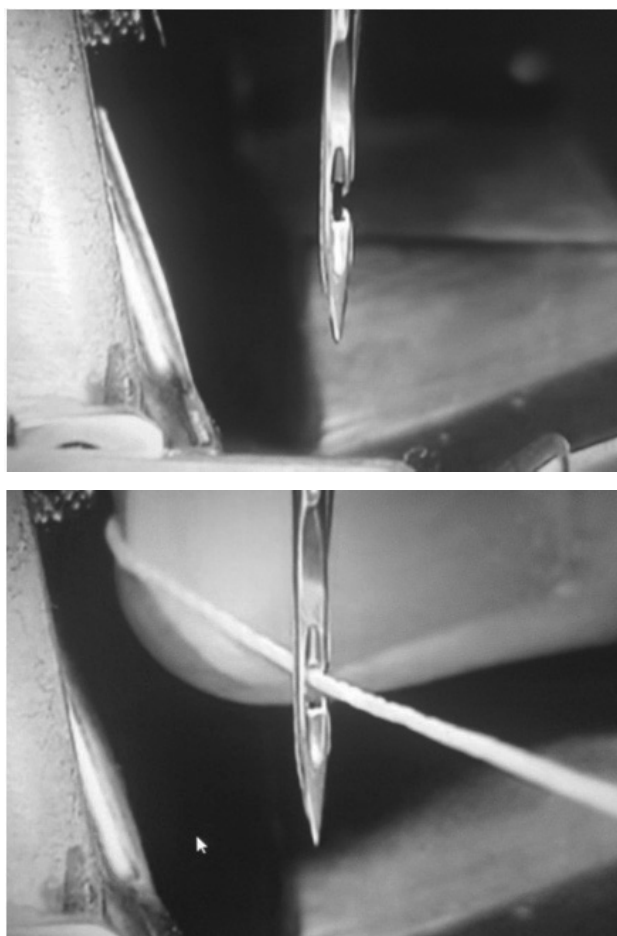


Figure 5: Hooked needle with moving sleeve/ needle-blocking seat
Slika 5: Kukasta igla

first step the hook needle together with the upper looper creates the upper part of the stitch on the top fabric surface. In the second step the needle and lower thread hook forms the bottom part of the stitch on the bottom fabric surface [6,7,8].

Double pointed needle with an eye in the middle (see Fig.6): During the work process the needle is fixed alternatively in two needle bars. In the first work step the needle operates above a throat plate being fixed in the upper needle bar. It makes the first part of a stitch placed on the top fabric surface. After the needle penetrate the fabric and moves under the throat plate, it is fixed in the lower needle bar to create the second part of the stitch on the bottom fabric surface. This is more advanced stitch formation principle. While the hook needle use to snag threads in delicate fabrics, the double pointed needle with a standard eye this problem does create [9,10,12].



Figure 6: Double pointed needle
Slika 6: Iгла sa dva vrha

4. THREADS

Sewing seams of the hand stitch 209, the thread has to be pulled through the material in its entire length. Therefore the length of the thread is limited. The most often machines work with 90 cm and 120 cm long threads. The threads for the hand stitch machines use to be sold in already cut-to-length pieces or in standard cones. To cut thread from a standard cone the machines can be equipped with manual or auto thread trimming devices. On average from 120 cm long thread 100 cm long seam can be created (seam length depends on material thickness).

Top quality hand stitch seams are sewn with special waxed silk or synthetic threads (produced by companies Fujix and Onuki Limited (Japan), others). They have higher strength and smooth surface allowing the machine to work in higher speed. All hand stitch machines can work also with regular threads slightly reducing the quality of the seam and sewing speed, but reducing production costs considerably. The waxed silk threads are much more expensive than regular ones.

5. ADDITIONAL FUNCTIONS TO INCREASE PRODUCTIVITY AND QUALITY

The most part of machines have reverse stitch function. By help of it any type of stitch pattern can be reversed stitching a front line of a jacket at the lapel break point (see Fig.7).



Figure 7: Lapel brake place on a men jacket with hand stitches

Slika 7: Mesto savijanja revera muškog sakoa sa ručnim ubodima

The machines can have also half stitch option. When at the end or a corner of the seam there is not more space for a full stitch, the machine can create a half stitch [14]. The seams use to be secured at the beginning and end with zig-zag stitches, bar-tacking stitches, or reverse-feed stitches. The machines use differential bottom and top feed mechanism [13,14] with a walking foot (see Fig. 8) to ensure qualitative seaming of different thickness woven and knitted materials. A presser foot consists of two parts - a left teathed foot and a smooth right foot. The teathed part of the foot together with the bottom feed dogs moves the fabric ahead while the needle is out. The right part of the foot presses the fabric down while the needle is in the fabric.

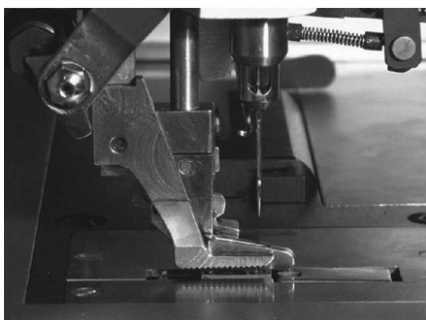


Figure 8: Walking foot of a hand stitch machine

Slika 9: Šivaća mašina ručnih uboda sa šetajućom nožicom

The user of a computerized machine [13,14,16] can program and store large number of different stitch patterns (up to 100). Programmable are also other parameters: stitch type, sewing speed, stitch length, thread trimming time etc.

6. CONCLUSIONS

By help of the real hand stitch machines industrially manufactured suits can get visual appearance similar to tailored ones. The machine seams are perfectly parallel to the edges where they are created and all stitches has precise determined length. These are important quality parameters for decorative seams with contrast colour threads. Seams with the same high quality can create only very skilful tailors. However, the real hand stitch machines cannot fully replace hand stitching. Changing tension of stitches at certain places of the seam, tailors form the needed curved shape of lapels and collars of a jacket. This process cannot be fully ensured by the machine.

Real hand stitch machines are also used to create decorative seams on other kind of garments and home textiles. However they are not seen often in clothing factories. They have comparatively high price and low stitching speeds. Limited length of the thread forming hand stitches 209 create certain difficulties in the work process, too. If the whole seam cannot be formed with maximal available length of the thread, sewing cycle has to be stopped to continue it with the new portion of the thread. Problematic is also securing of the end/beginning of the seam to avoid its unraveling. This process takes additional time and can reduce the quality of the seam if the thread changing place becomes visible. However, real hand stitch machines are ten time more productive than hands of a experienced tailor and in industrial manufacturing of men suits cannot be replaced with any other kind of machine.

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