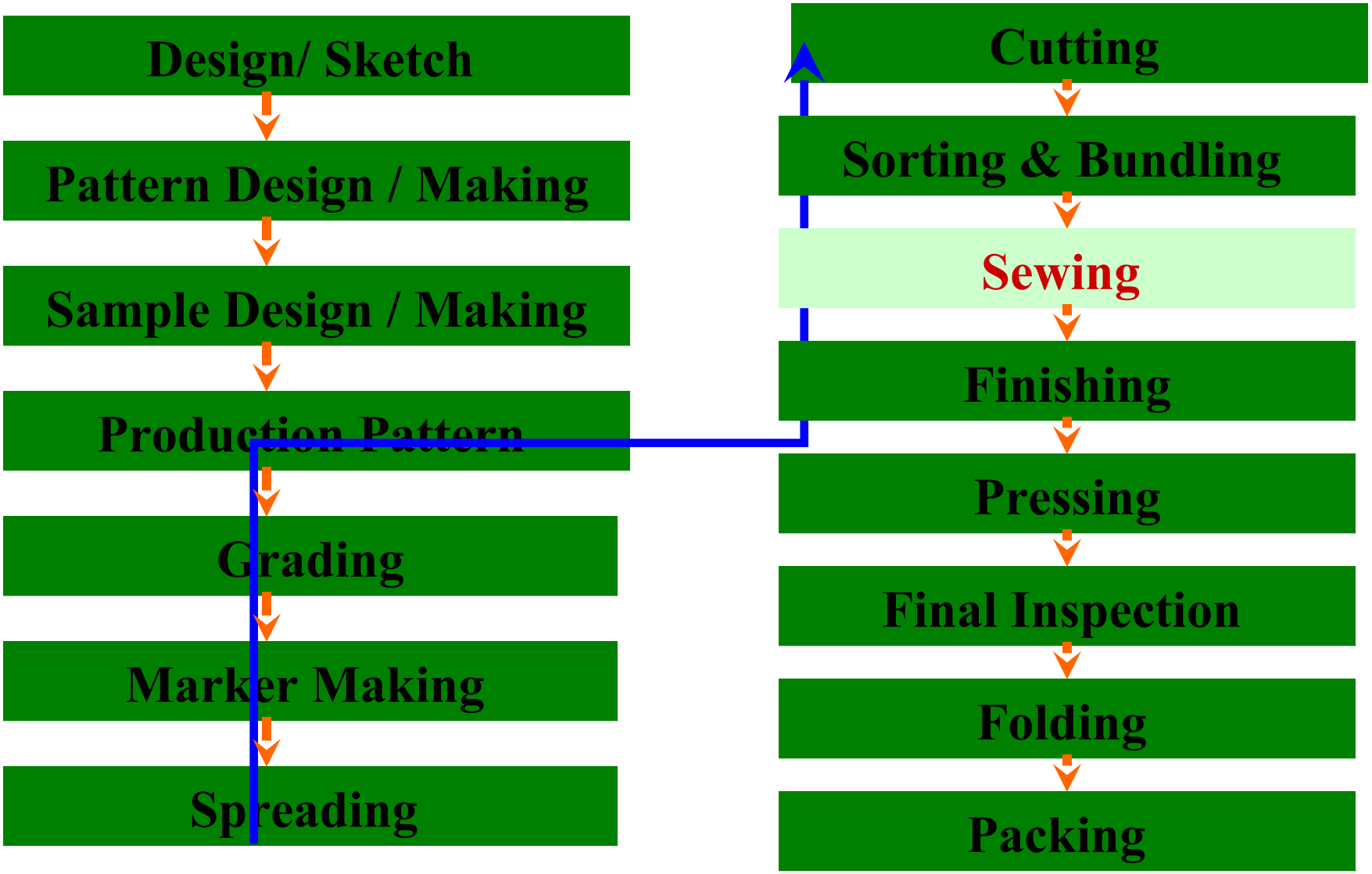
History and Development of the Sewing Machines

- In 1791, British inventor Thomas Saint was the first to patent a design for a sewing machine. His machine was meant to be used on leather and canvas.
- In 1814, an Austrian Tailor, named Joseph Madersperger, presented his first sewing machine.
- In 1830, a French tailor, Barthelemy Thimonnier, presented a sewing machine that sewed straight seams by using chain sewing machines.
- The lock stitch sewing machine was invented by Walter Hunt in 1833.
- Elias Howe patented his machine in 1845; using similar method of Hunt's.
- Isaac Merritt Singer, invented rotary sewing machine in 1851. This machine combined the elements of Thimonnier's, Hunt's and Howe's machines.
- Allen Wilson and John Bradshaw had developed a sewing machine, which was an improvement over Singer's and Howe's.

- **Charles Miller patented the first machine to stitch buttonholes in 1856.**
- **James Edward Allen Gibbs, a farmer of Virginia, patented the first chain-stitch single-thread sewing machine on June 2, 1857.**
- **Swing machines continued being made to roughly the same design, with more lavish decoration appearing until well in to 1900s, when the first electric sewing machines started to appear.**
- **The first electric machines were developed by Singer Sewing CO. and introduced in 1889.**
- **In 1946, the first TOYOTA sewing machine was invented.**
- **Modern machines may be computer controlled and use stepper motors to achieve very complex patterns.**


LINE

Flow Chart of Garments Manufacturing Process

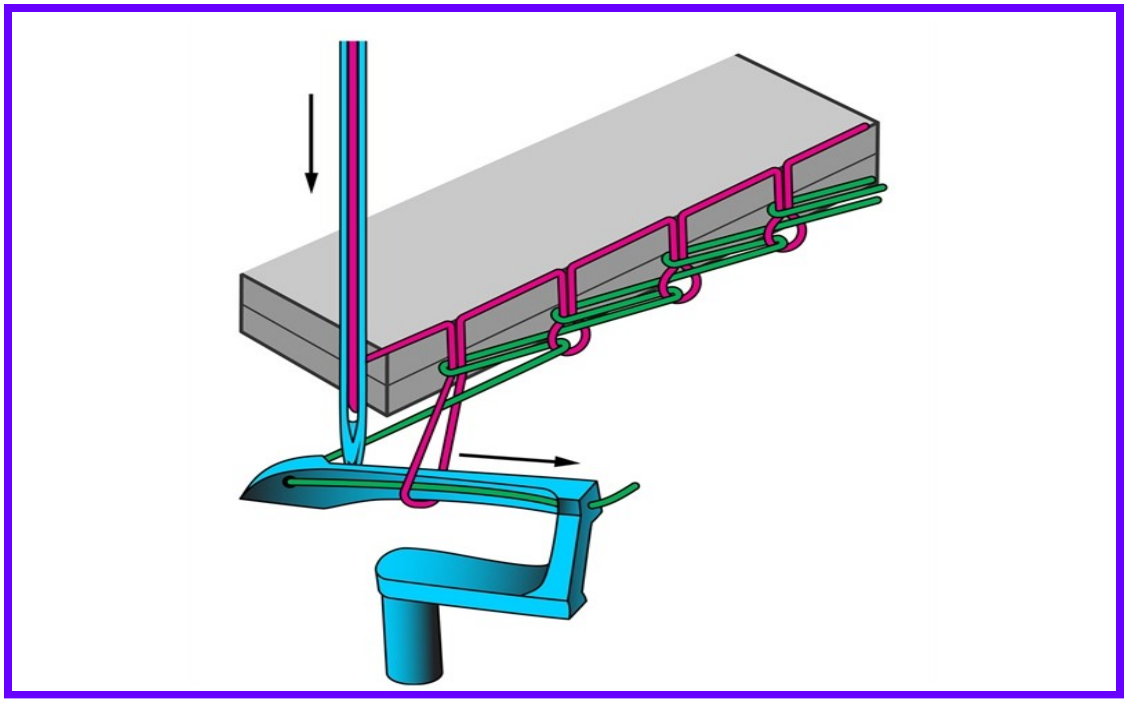


STITCH

- **Loop or loops of one or more threads when bounds with**
- **each other by interlacing, interlocking, interlooping or**
- **intralooping or any combination during sewing. Then**
- **each unit of such structure (Seam) is called stitch.**

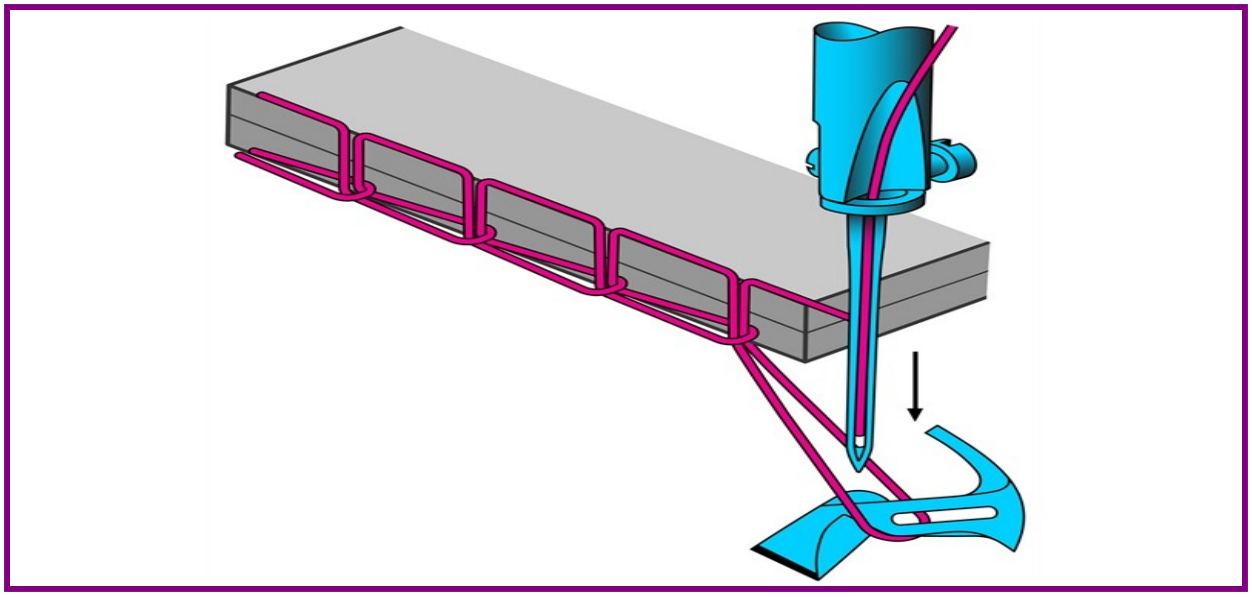
INTERLOOPING

- **Passing of a loop of thread through another loop formed**
- **by the different thread.**



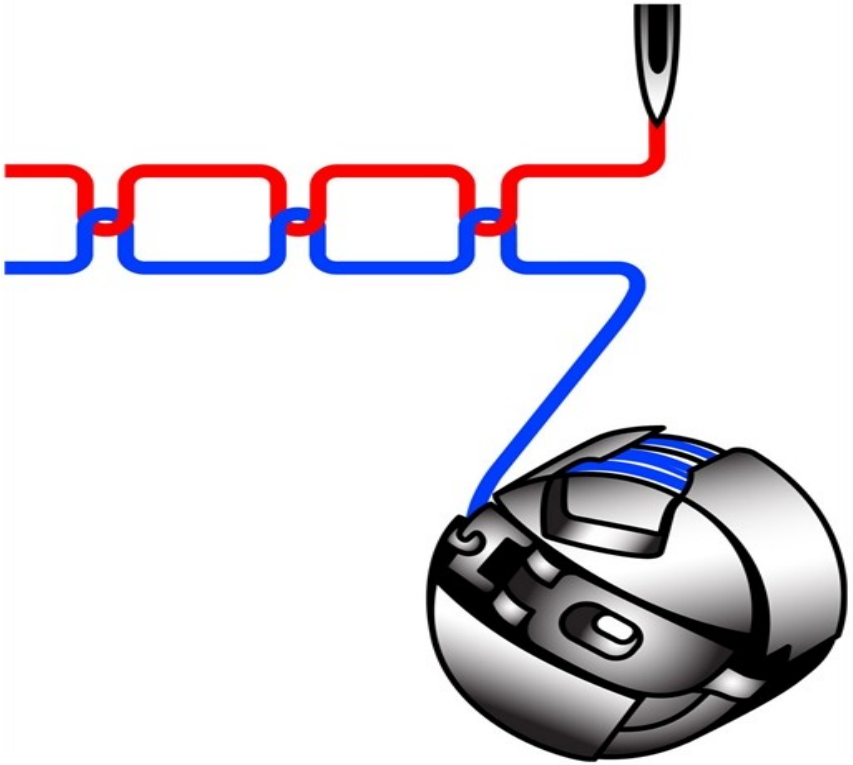
INTRALOOPING

- **Passing of a loop of thread through another loop**
- **formed by the same thread.**



INTERLACING

- **Passing of a thread over or around another thread or loop of different thread.**



Stitch Classification/Stitch Types

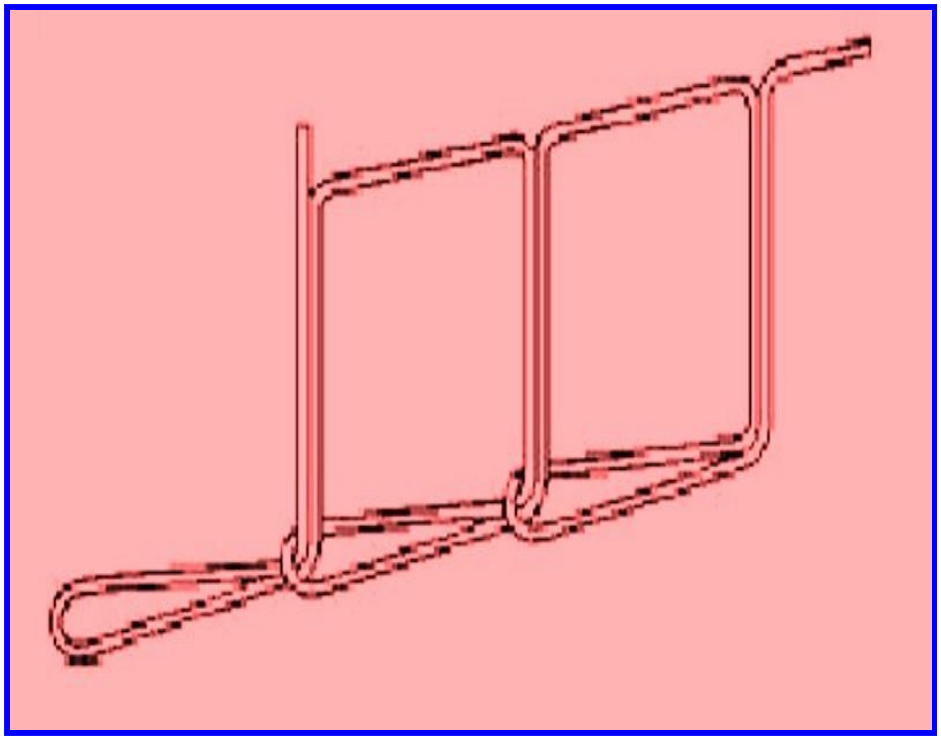
- **There are 70 types of stitches. Among them 18 to 20 types of stitches are widely used in garments industries.**
- **Stitches are divided into 6 classes:**

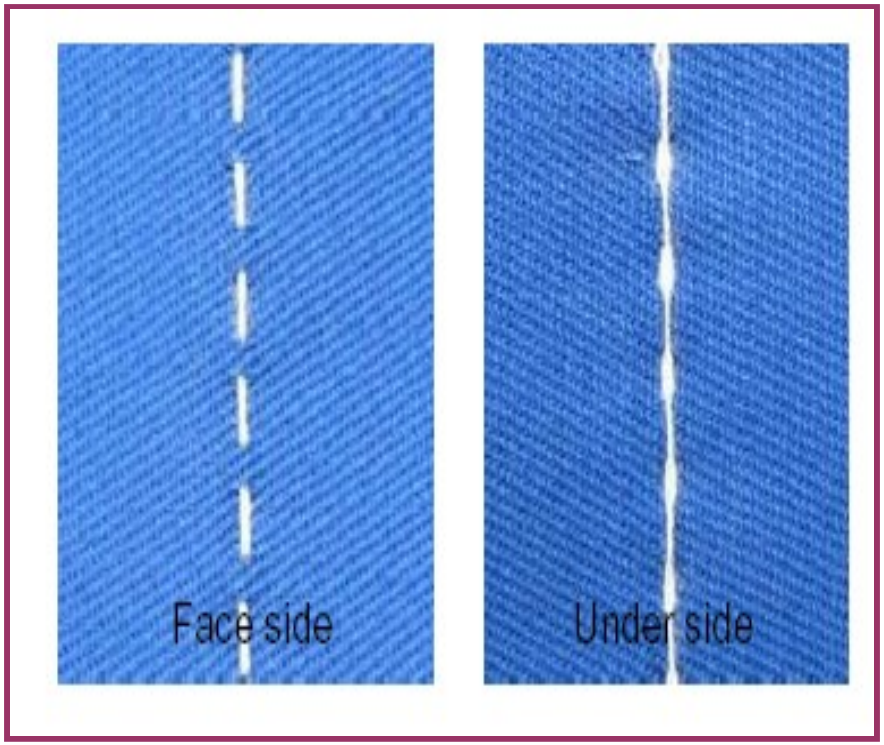
1. **Stitch class-100 (Single Needle Chain Stitch)**
2. **Stitch class-200 (Hand Stitch)**
3. **Stitch class-300 (Lock Stitch)**
4. **Stitch class-400 (Multithread Chain Stitch)**
5. **Stitch class-500 (Over edge Stitch)**
6. **Stitch class-600 (Covering Chain Stitch)**

Stitch class-100 (Single Needle Chain Stitch)

- **This class of stitches are formed by intralooping.**
- **One or more needle thread is used for stitch formation.**
- **A thread is passed through the fabric by the needle and loop is prepared which is bound with the previous loop made by the same needle. In this way row of stitch is made.**
- **This type of stitch includes stitch type-101, 103 etc.**

Stitch Type 101





Stitch class-100 (Single Needle Chain Stitch)

- **Applications :**
- **Used in lap and flap positioning, temporary joining, positioning, basting, hemming, blind stitching, button holing, button attaching purposes.**

- **Disadvantages :**
- **Security of stitch is very poor. If one end of the thread is pulled, then the whole sewing will be opened.**

Stitch Class-103 : Blind Stitch

- **This type of stitch is clearly seen from the back side, but not from the front side.**
- **Mainly uses in Button holing, button attaching, hemming.**
- **This is not long lasting stitch.**

Stitch Class-103 : Blind Stitch

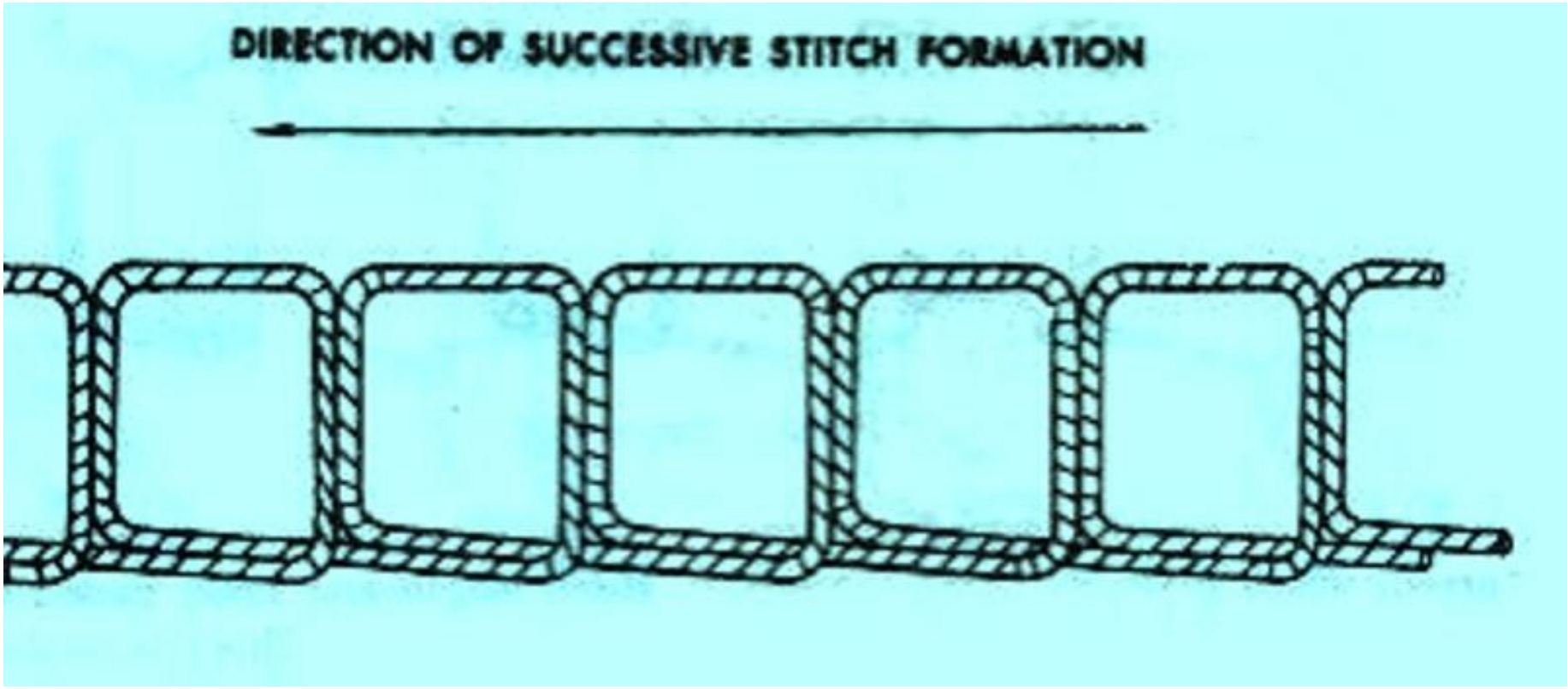
Stitch class-200 (Hand Stitch)

- **This class of stitch looks like domestic hand stitch.**
- **It is made by special type of needle and sewing machine, which is called pick stitch sewing machine.**
- **Needle thread is passed from one side to another side in the fabric and makes a sewn line.**

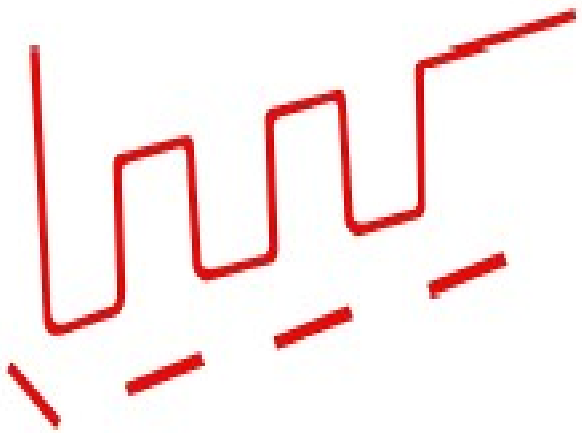
Stitch class-200 (Hand Stitch)

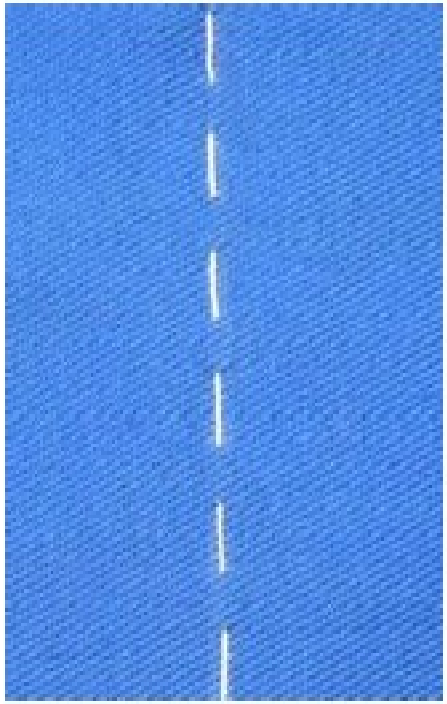
- **Applications :**
  - **Used in lapel of jacket, coat and expensive clothes.**
  - **Stitch type-209 is used for edge of the jacket.**
- **Disadvantages :**
  - **Time consuming operation.**
  - **Higher cost.**
  - **Speed of sewing is very slow.**
  - **Rare in use.**

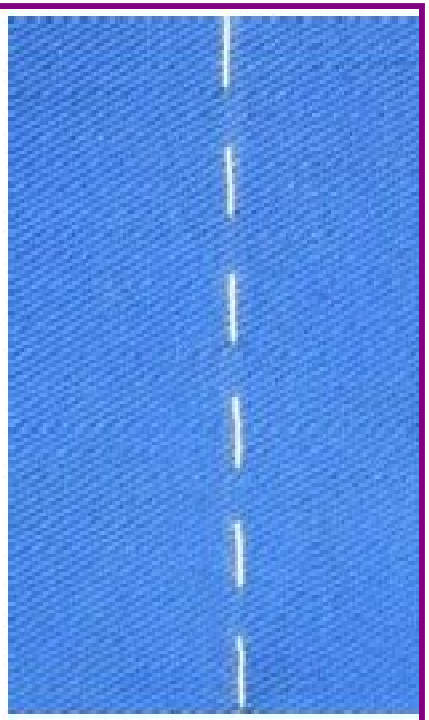
Stitch Type 202



Stitch Type 209



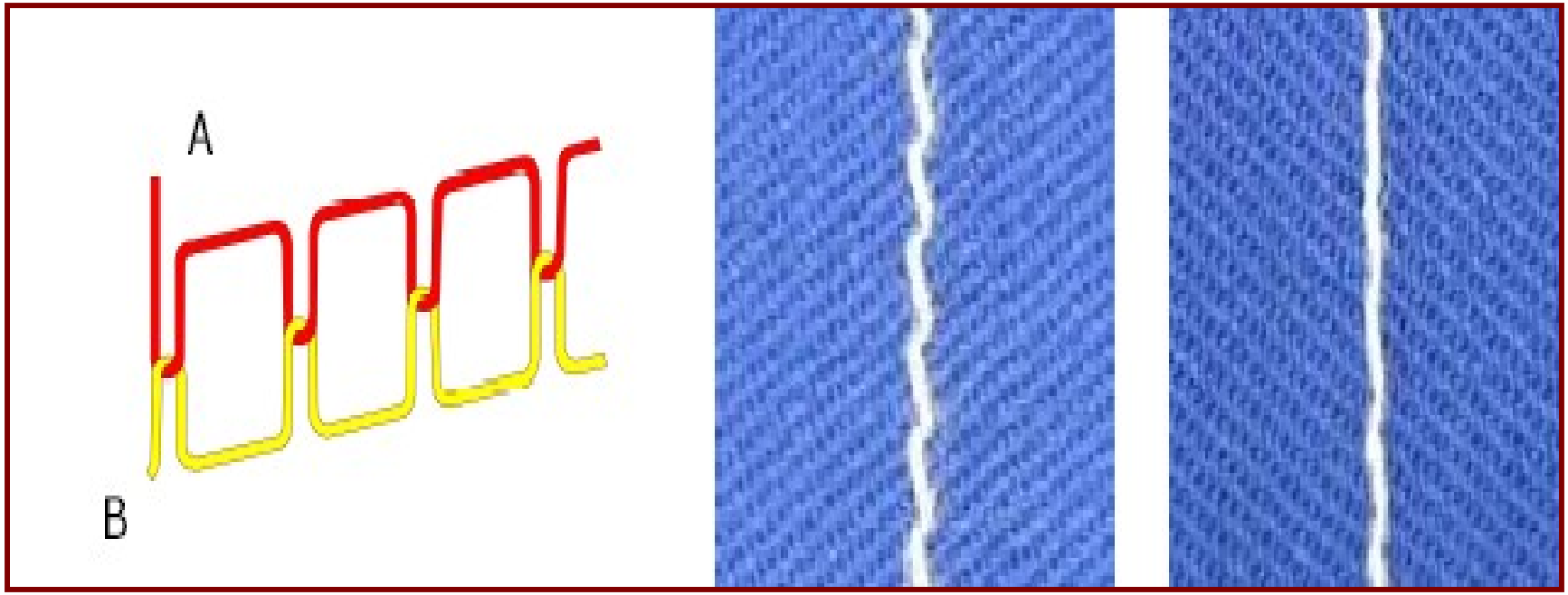




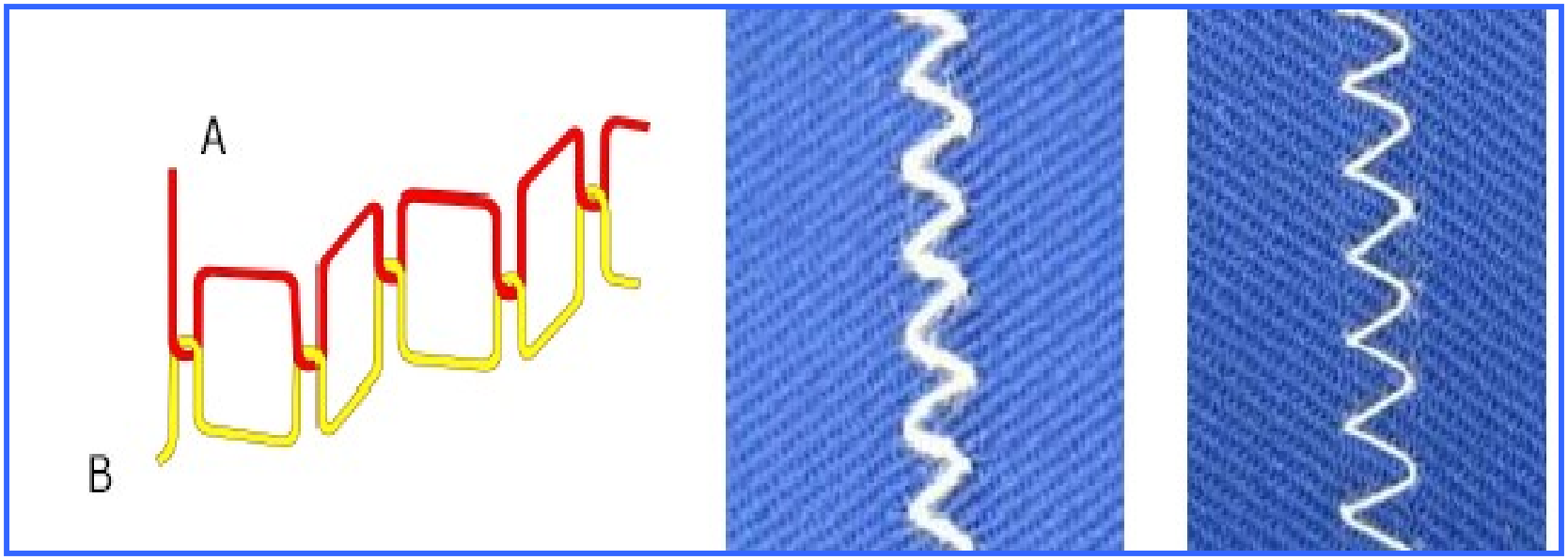
Stitch class-300 (Lock Stitch)

- Two or more sets of threads are used in this class of stitch.
- One set of thread is called needle thread and another set is called bobbin thread.
- Here one set of threads are interlaced with another set of thread and make bond.
- Fine yarn is preferable for this type of stitching.
- Stitch type 301 is the most common among 300 class.
- General purposes are sewing, joining different components during garments making, top stitching etc.

Stitch Type 301



Stitch Type 304



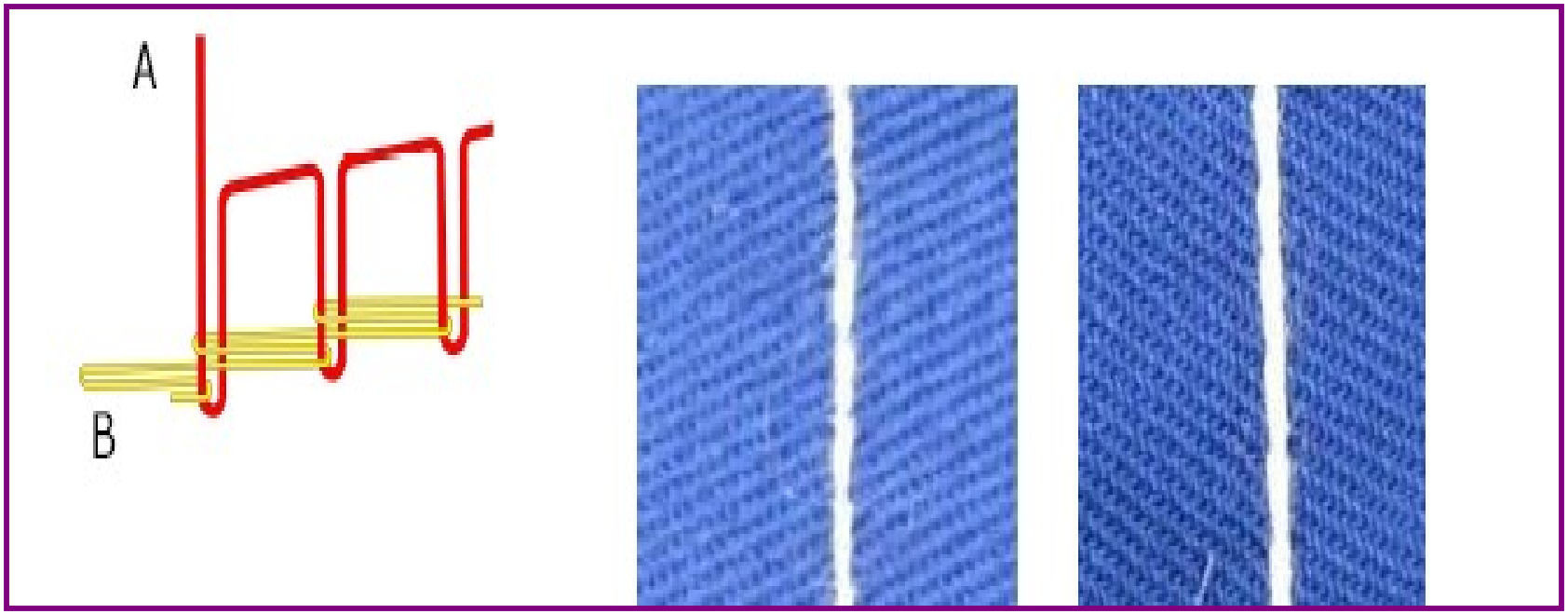
Stitch class-300 (Lock Stitch)

- **Applications :**
  - » **Extensively used in sewing and fabric attachment as pocket, collar, cuff, facing etc.**
  - » **Also used in top stitching, button holing, button attaching, blind stitching etc.**
  - » **Stitch type 304 is zigzag type, used for attaching lace, elastic and so on.**
- **Advantages:**
  - » **Stitches are secured, higher strength and extensibility (around 30%).**
  - » **Both side of this stitch looks same.**
  - » **More secured stitch than chain stitch.**
- **Disadvantages:**
  - » **The main problem of lock stitch is the lower capacity of bobbin thread requires frequent bobbin thread changing.**
  - » **Not suitable for knit fabric sewing.**

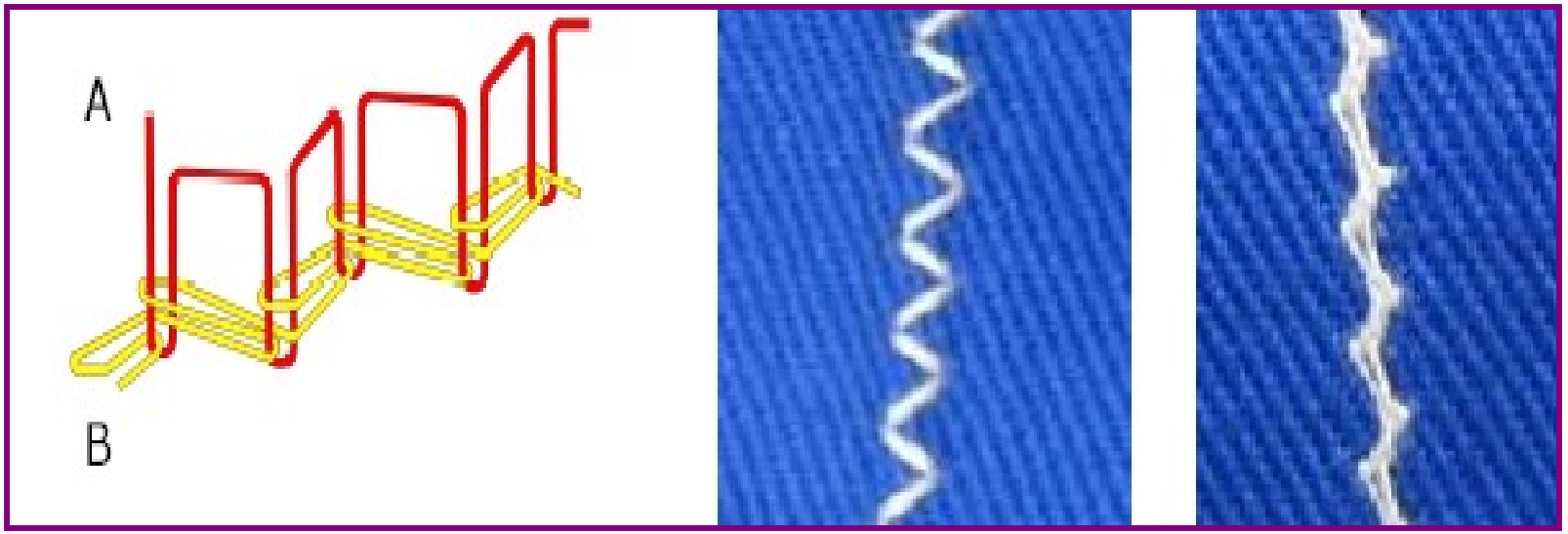
Stitch class-400 (Multi Thread Chain Stitch)

- Stitches are formed by two or more set of threads.
- One set of thread is called needle thread and another set is called looper thread.
- The loop of one set thread is passed through the fabric and bound with another set of thread by interlacing and interlooping.
- Stitch type 401 is the most common among 400 class.
- The front side of the stitch is looks like lock stitch and the back side is seen as double chain.
- Sometimes this type of chain stitch is called double locked stitch, because one needle thread is bound with two loops of the lower thread.

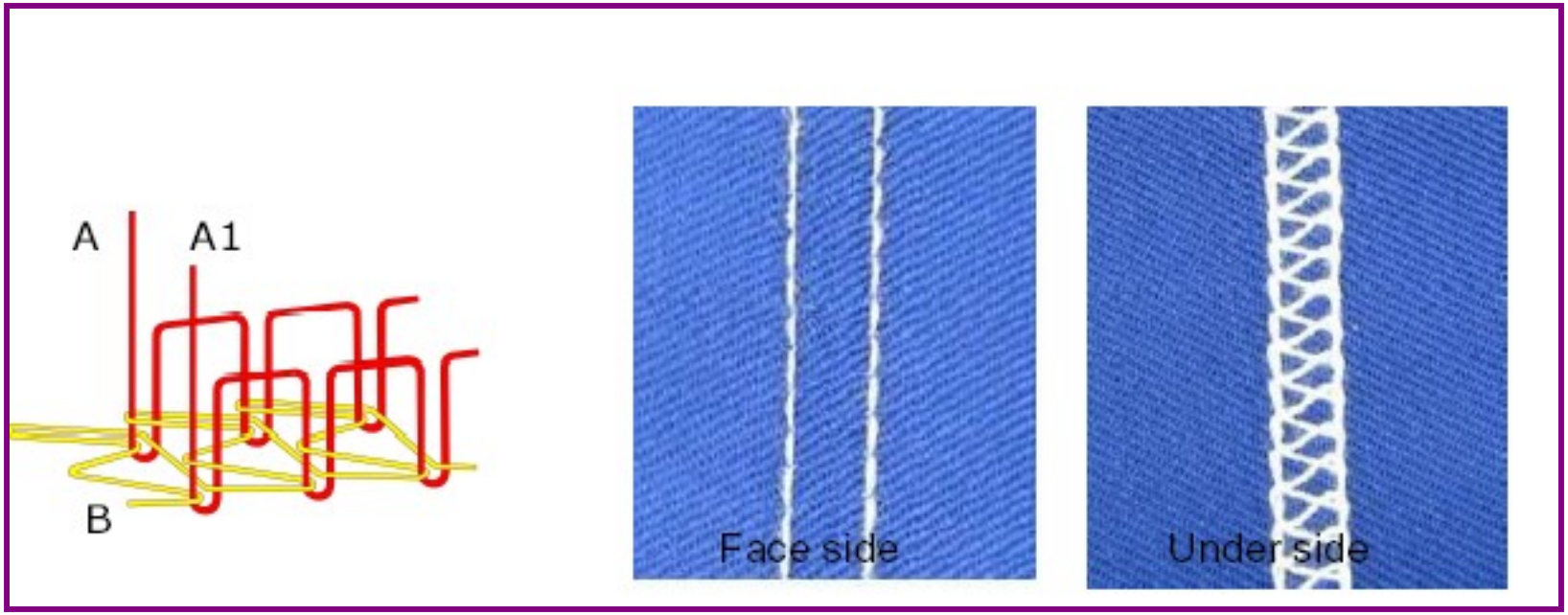
Stitch Type 401



Stitch Type 404 (Zigzag Chain Stitch)



Stitch Type 406 (Two Needle Bottom Cover Stitch)



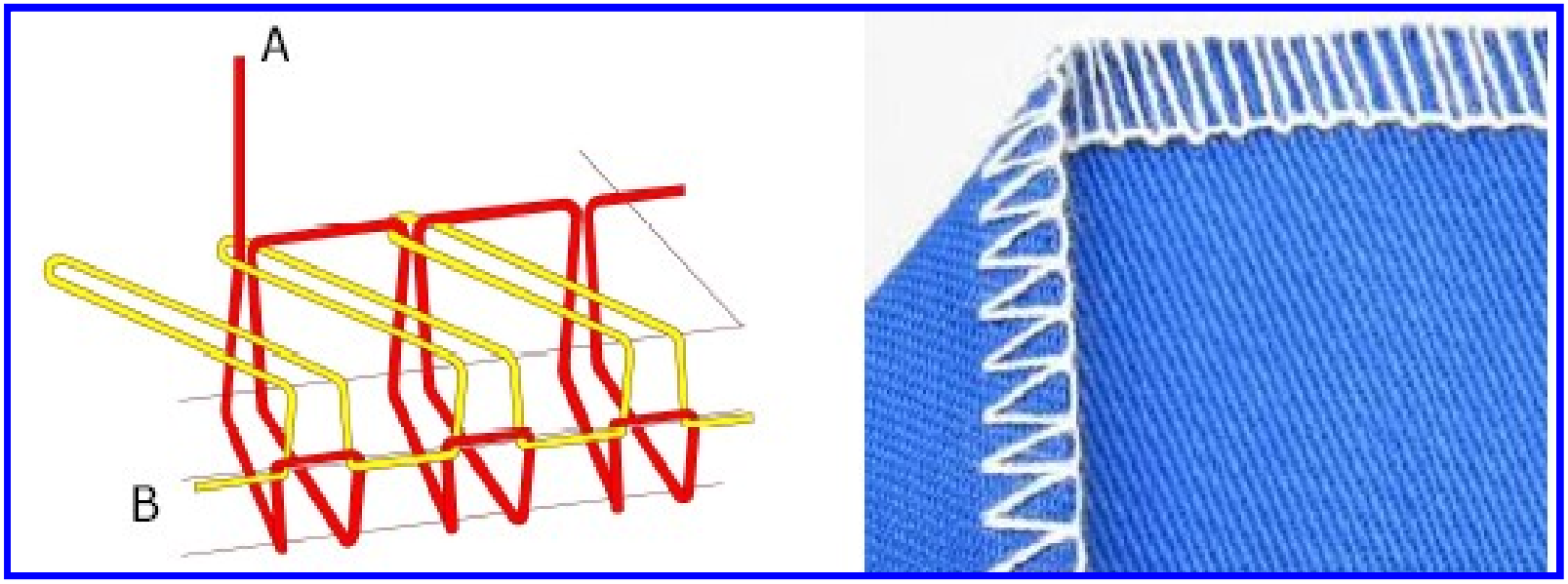
Stitch Class-400 (Multi Thread Chain Stitch)

- **Applications :**
  - **Stitch type-401 is used for long sewing in the jeans and trousers. Also this type of stitch is used with over edge stitch.**
  - **Stitch type-406,407 is used for joining lace, braid, elastic with the garments.**
- **Advantages:**
  - **Strength of 401 is higher than 301.**
  - **Less possibility of producing seam pucker.**
  - **Extensibility is same as Lock stitch.**
  - **Chain stitch can be made by comparatively less tension of thread, so that this classes of stitch is produced with high speed.**
  - **SPM of chain stitch machine is 8000, where SPM of lock stitch machine is 6000.**
- **Disadvantages:**
  - **Lower resistance to runback and have increase the bulk under the seam.**

Stitch class-500 (Over Edge Stitch)

- **This type of stitch is made by one or more sets of thread and is bound by minimum loops of one set of thread by rotating the fabric edge. As a result thread cannot be drawing off from the fabric edge.**
- **Before sewing the fabric edge is cleaned by the knife of the machine which is placed at front of the needle.**
- **Sometime it is called over locking machine, but it is mainly over edge stitch.**
- **Width of stitch may vary from 3 to 5 mm.**
- **Stitch type-504 is the most common. Stitch type-503, 512, 514 also positioned in this category.**

Stitch Type 503 (Two Thread Over Edge)



Stitch class-500 (Over Edge Stitch)

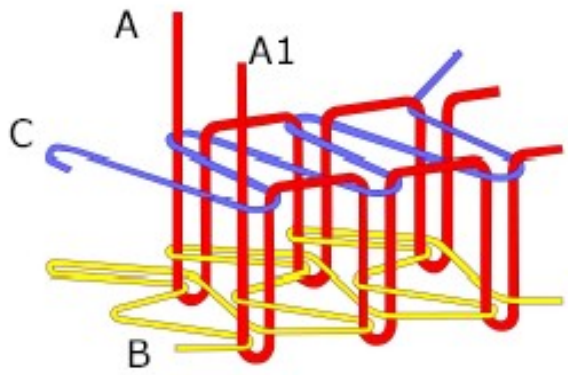
- **Applications:**
  - **Stitch type-504 is used for decoration of fabric end.**
  - **It is also used in combination with lock stitch and chain stitch.**
  - **For light fabric stitch type-512 is used.**
  - **For coarse fabric such as denim, jeans, cord stitch type-514 is used.**
- **Advantages:**
  - **Extensibility is higher (up to 30%).**
- **Disadvantages:**
  - **This stitch type is prone to seam grinning (the threads are exposed when the seam is pulled at right angles to the line of sewing).**
  - **The finish may be somewhat bulky due to the complexity of the seam construction.**

Stitch Class-600 (Covering Chain Stitch)

- **Stitches under 600 class are formed by three sets of threads.**
- **First set of thread is called needle thread, second set of thread is called top cover thread and third set of thread is called bottom cover thread.**
- **Stitch type-602 is the most common.**

- **Applications:**
  - **Stitch type-602 is used for attaching tape, lace, braid, elastic to knit fabric.**
  - **Stitch type-606 is used for making knitted undergarments. It is also used for decorative purpose.**
  - **For making cover stitch, top stitching in the fabric edge this type is also used.**
- **Disadvantages:**
  - **Stitches under this group are very complex and may need up to 9 threads.**

Stitch Type 602 (Covering Chain Stitch)



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Merits and Demerits of Stitch type-301

- **Merits :**

- **Seam extensibility is around 30%.**
- **Seam strength is sufficient.**
- **Similar appearance on both sides of fabric.**
- **Stitches are secured and security can be increased by back taking.**
- **Abrasion resistance is better.**

- **Demerits :**

- **- Lower capacity bobbin thread requires frequent bobbin**
- **thread changing.**

Merits of Stitch type-304

- **Zig-zag type.**
- **It is used for lace or elastic attachment on garments.**
- **Extensibility comparatively higher than stitch type-301.**

Difference between CHAIN STITCH and LOCK STITCH

Chain Stitch	Lock Stitch
Stitches are formed by two or more sets of threads: Needle Thread and Looper Thread.	Stitches are formed by at two sets of threads: Needle Thread and Bobbin Thread.
Threads are bound together by interlacing and interloping.	Threads are bound by interlacing.
Looks like lock stitch at top side and double chain at under.	Appearance is similar in both sides of the fabric.
Strength is higher than lock stitch.	Strength is lower than chain stitch.
Possibility of seam pucker formation is more than lock stitch.	Possibility of seam pucker formation is less than chain stitch.
Extensibility is 30%.	Extensibility is 30%. Sometimes less than that.
Chain stitch m/c speed 8000 SPM.	Lock stitch m/c speed 6000 SPM.

THANKS to ALL