

Single Needle Lock Stitch Machine for Handicaps

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Abstract- Single needle lock stitch Machine is operated by the coordination of brain, hand and foot .This Machine cannot operated by the Handicaps because they cannot operate the machine by foot. So we designed the hand Pedal System for those persons to operate the machine. This System is located at the top of the machine nearby bar tuck stitch. This will helps the handicaps to operate the machine in their hand very easily by the coordination of brain and hand .When the machine starts they adjust the speed of machine by using the hand and hand pedal. This process is done when the angle of hand pedal and angle of motor lifter are equal .This operation Helps the handicaps to operate the machine very easily.

Index Terms- Needle, Foot and Hand Pedal, Stitches, Speed.

1. INTRODUCTION

1.1 SINGLE NEEDLE LOCK STITCH MACHINE

Single Needle Lock Stitch machine is operated by pedal movement using foot pedal by normal human. But for handicaps without legs, it is not possible to operate foot pedal. So, a single needle lock stitch machine with hand pedal system is developed for handicaps at the same cost of a normal machine. This hand pedal system is located at the top of the machine nearby strengthening stitch.

1.2 SINGLE NEEDLE LOCK STITCH MACHINE MOTOR FUNCTION

In Single needle lock stitch machine, a servo motor is used. The motor is connected to foot pedal through lever rod. Motor and machine pulley is connected by tape for drive transmission. By giving pedal movement, the drive is transmitted from motor to machine shaft and stitching process is carried out.

1.3 MOTOR SPECIFICATIONS

- Speed: 2860 RPM/3450 RPM
- Frequency: 50/60 Voltage: 220 V/440 V
- Amps: 2.1/1.8

- Number of Poles: 2
- Phase: Single phase Power: 1/3 HP (250 Watts)

1.4 PRINCIPLE AND OPERATION OF SINGLE NEEDLE LOCK STITCH MACHINE

In Single Needle Lock Stitch machine, the motor is connected with foot pedal. By pedalling the foot pedal, the drive from the foot pedal is transmitted to machine through rod connection between motor pulley and machine pulley shaft. Thus, single needle lock stitch machine is operated.

Lock Stitch is most common type of stitch made by a sewing machine. A single needle lock stitch sewing machine uses two threads, one in the needle and the other in the bobbin. In Lock Stitch, needle thread pass through another thread from bobbin and interlacing is done in a simple manner.

II. MATERIALS AND METHODS

2.1 SINGLE NEEDLE LOCK STITCH MACHINE FOR HANDICAPS

The single needle lock stich machine is used by normal human being so for further usage we developed the same single needle lock stich machine for handicaps by altering small mechanism in single needle lock stich machine without affecting the efficiency of machine.

2.2 HAND PEDAL SYSTEM

Instead of foot pedal system the hand pedal system is developed. The hand pedal system is placed at the right hand side of single needle lock stitch machines bed, nearby strengthening stitch and it is operated by hand.

2.3 HAND PEDAL DETAILS

Hand pedal is made up of stain less steel with an angle of 26° is proceed and it is developed with the less load applied spring it's very easy to apply the

load of hand pedal. And the loaded pressure controlled by spring.

2.4 WORKING PRINCIPAL OF HAND PEDAL MACHINE

This hand pedal system is developed for handicaps. The hand pedal is connected with a motor through tape and guide roller with pulley which is located at the center of machine, and by pressing hand pedal through tape connection with pulley when the motor handle is released the motor runs and the motor pulley to machine pulley is connected with belt and the single needle lock stitch machine is operated.

2.5 WORK PLAN

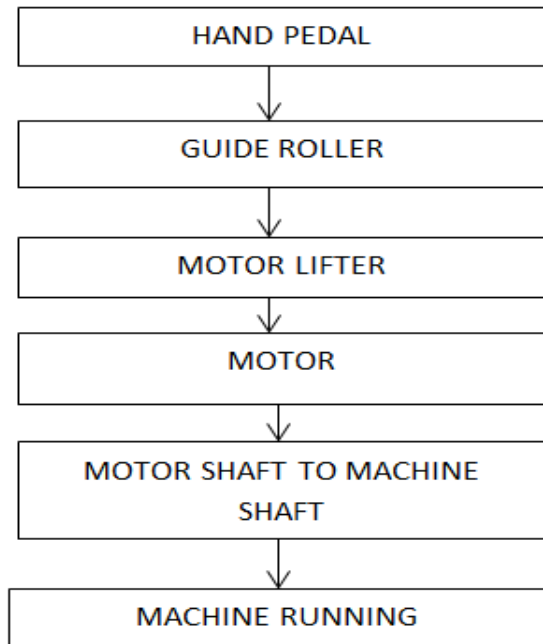


Figure 1: Flow Diagram

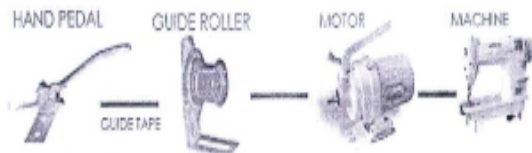


Figure 2: Work Plan

The hand pedal is fixed in the top of machine nearby stitch bar tuck and it is travel to the guide roller with the help of guide tape and then the tap is fixed at motor lever and the motor runs the motor pulley has reevaluate the speed of motor pulley and it is transfer to the machine pulley by the help of driving belt the machine is running up.

2.6 DESIGN OF HAND PEDAL SYSTEM:

The motor is designed at the angle of 22°-48° of variation is 26°, and according to the motor angle of variation the hand pedal is designed for 26° of angle for the operation of single needle lock stitch machine.

2.7 HAND PEDAL:

The hand pedal is very simple alteration in single needle lock stitch machine for easy operation of handicaps, and it is made up of stainless steel for long life. The hand pedal consists of base fixing clamp, connecting spring, movable lever and tap connector.

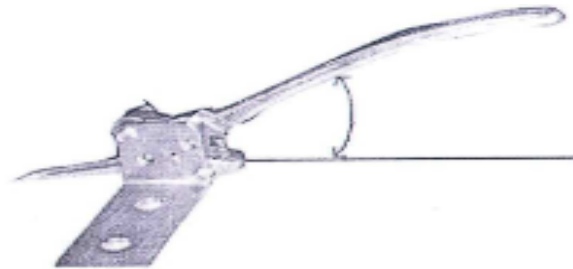


Figure 3: Hand Pedal

2.8 GUIDE ROLLER

The roller guide is placed between the hand pedal and motor lever for guiding the tape for operating the single needle lock stitch machine. It is only a supporting guide of revaluating curving 180° angle at oscillation.

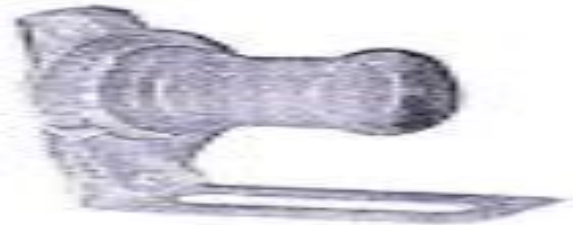


Figure 4: Guide Roller

2.9 SPINDLE TAPE

The tape is used to transfer the motion between the hand lever and motor lever through the guide roller.



Figure 5: Spindle Tape

III. RESULTS AND DISCUSSION

3.1 SPEED OF MACHINE CALCULATING METHOD:

In normal foot pedal single needle lock stitch machine speed is varied from (2900-3460 rpm).

In the hand pedal single needle lock stitch machine speed is varied from (2910-3440 rpm).

By comparing these two system of single needle lock stitch machine the efficiency and cost of machine is same

3.2 SPEED TESTING METHOD:

The speed measurement is evaluated in rpm, and the speed of single needle lock stitch machine is varied from 100-3500 rpm. For measuring the speed optical LED measurement system is used.

3.3 MEASURING INSTRUMENT:

Optical LED measurement method is used. This type of measuring instrument is testo464. This instrument measures the rpm and rps.

3.4 TESTO 460 FUNCTION DETAILS:

3.4.1 FUNCTION:

The Hold-button allows particularly convenient reading of the measurement values. The illuminated display enables easy read-out of the measurement values even in bad lighting. testo460 is very small, handy and easy to operate. The clip-on protective cap, wrist strap and a belt holder provide safe storage, ensuring an especially long working life.



Figure 2: Testo meter

3.4.2 DETAILS:

The measuring speed in rpm can be evaluated within 0.5 sec.

The idea distance to the measurement object is between (10-40 cm) by simply attach a reflective marker to the measurement. Easily measured by nearly position of shaft or disk or crank

- sensor type -optical sensor
- Measuring range - (100-29999)rpm
- Accuracy - (+-0.02%)
- Resolution - 0.1rpm(100-999.99rpm) - 1rpm (1000-29999rpm)
- Measuring rate -0.5 sec N.
- Operating temperature -(0-50°)
- Selectable unit -rpm,rps

3.5 SPEED TEST RESULT

The speed of the hand pedal and foot pedal is varying in the alteration of stitch number.

STITCH NUMBER	SPEED OF FOOT PEDAL MACHINE (RPM)	SPEED OF HAND PEDAL MACHINE (RPM)
1	2900	2910
2	2980	2980
3	3185	3180
4	3290	3280
5	3460	3440

Table 1: Speed Result

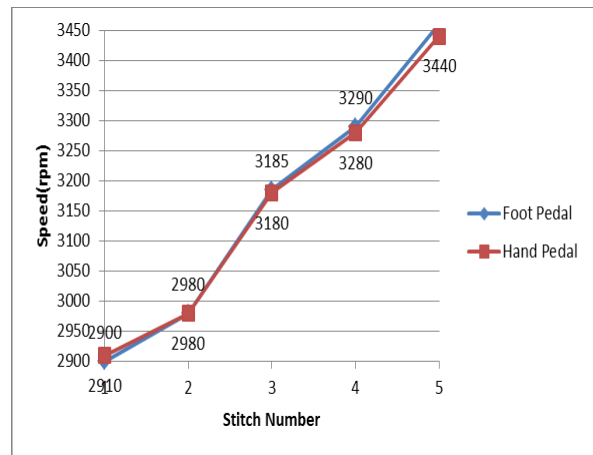


Figure 3: Speed Comparison Graph

3.6 STITCHES PER INCH TESTING RESULT

The stitches per inch of the hand pedal and foot pedal is varying in the alteration of stitch number.

STITCH NUMBER	STITCHES PER INCH	STITCHES PER INCH
1	27	27

2	13	13
3	10	10
4	8	8
5	6	5

Table 2: Stitches Per inch Result

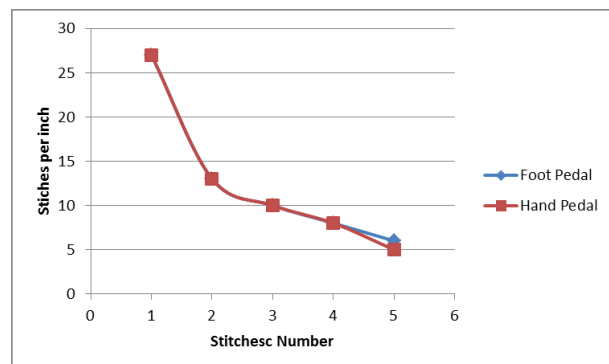


Figure 4: Stitches Comparison Graph

3.7 ANGLE MOTOR

The angle motor released position is 48° with load condition 28° the load difference of motor lever is 26° .

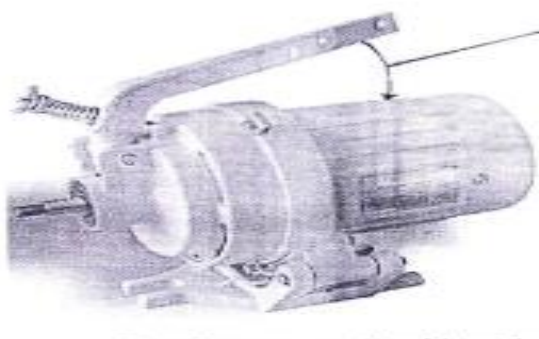


Figure 5: Angle Motor without Load

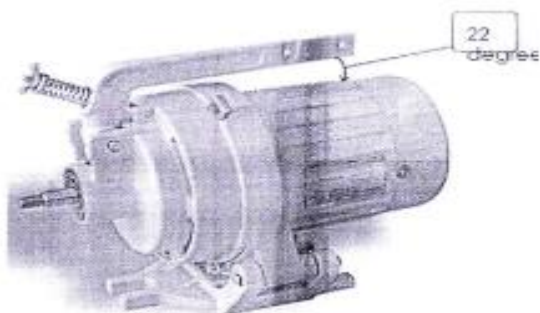


Figure 6: Angle Motor with Load

3.8 ANGLE OF HAND PEDAL

The angle of hand pedal released position is 30° with load condition 4° the load difference of the motor lever is 20° .

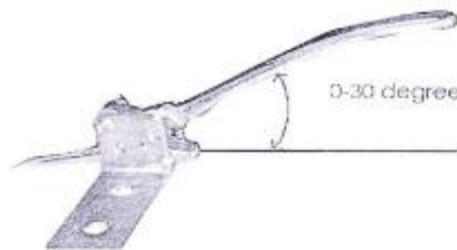


Figure 7: Hand Pedal without Load



Figure 8: Hand Pedal with Load

3.9 MACHINE OPERATOR FEED BACK

This hand pedal single needle lock stitch machine is very useful for the people like me. It is very simple and easy to operate the machine. This modern development gives a good job opportunity for us. This hand pedal single needle lock stitch machine cost is minimum as like the normal foot pedal single needle lock stitch machine. But in production wise the output of hand pedal lock stitch machine is same as normal foot pedal lock stitch machine, so it is very useful and better way of development.

IV. CONCLUSION

The hand pedal single needle lock stitch machine is developed in the angle based method. The angle of hand pedal is 26° as like motor lever angle so there is no loss in efficiency and instead of connecting rod we use the spindle tape for reducing the weight so no loss in load. The cost of hand pedal system is lesser than foot pedal system. When the stitch number is same for hand pedal single needle lock stitch machine and foot pedal single needle machine, the stitches per inch (SPI) and speed (RPM) remain same.

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